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ART. I .- ON EGYPTIAN OPIUM. By JONATHAN EVANS, Jr.

(Extract from Thesis. Phil. Col. Pharm.)

During the course of the year 1833, a parcel of opium was imported into this city direct from Leghorn, and by its favourable appearance found at first a ready market; it being a fact however, that opium taken to France mixed with impurities and manufactured into flat cylindrical cakes is occasionally received into this country, suspicions were excited, that the article now offered as Egyptian opium was a sophistication.

This idea being held out, a portion was submitted to analysis, and found to contain an unusually small per centage of morphia; the account of which was published in the fifth volume of the Journal of the Philadelphia College of Pharmacy, by J. Scattergood.

Subsequently, a quantity of opium has been thrown into the market, similar in form and appearance to the importation of 1833, and sold under the same name.

As regards the merits of the last mentioned article, a difference of opinion prevails; by some it is considered superior

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to the first; by others, very little or no better. These opinions may be considered as founded on supposition, no trial that I am aware of having been made to ascertain its proportion of morphia.

Viewing the subject as one of importance, I commenced a course of experiments, the results of which, together with some observations on the comparative value of the article, I now submit.

Its form is that of roundish flat masses, varying in weight from one to eight ounces, having been covered with a greenish leaf, while moist, on many of the pieces fragments of the midrib only remaining; the brown capsules with which Turkey opium is mostly surrounded are entirely absent. Its general appearance is attractive; upon breaking several pieces, however, I was struck with a difference of colour, some being darker than others, and than common opium. Its fracture is dull and uneven, and when freshly broken the surface has a slightly unctuous feel; taste not so strongly bitter, but acrid and astringent, and its odour more nauseous. When cold, it is hard and friable, easily reduced to powder which is of a light brown colour.

It approaches nearer to the form of an extract than common opium, but less so than a specimen of pure Turkey opium which I had an opportunity of examining; the fracture of which was smooth and shining.

Before reciting the analysis, it may be right to remark that but little attention has been paid to those principles occurring in minute quantities, and which are of little import, except as matters of curiosity; the principal object has been to isolate those of practical importance.

In performing the first experiment, I followed, with but little variation, the formula of Dr. Staples, recognized by our national Pharmacopæia as being the best for obtaining morphia, and by which the most accurate conclusions may be made of the comparative strength of the opium.

Experiment 1st. Two thousand grains were submitted to the action of twelve fluid ounces distilled water, for six days, the temperature varying from 80° to 90°. The dregs were sepa-

rated by a filter of unsized paper, which was previously moistened with water. The resulting solution was of a dark colour, of a very bitter, and somewhat acrid taste, with the usual heavy, narcotic smell of opium, and having a specific gravity of 1.069. The dregs were again digested in eight fluid ounces distilled water, four days, and a solution produced much less coloured than the first, of specific gravity 1.031. Finally, the dregs were washed with four ounces of water, passed and repassed until they ceased to yield colour to that menstruum.

The several solutions were mixed and evaporated by means of a water bath to the consistence of a soft extract.

Upon redissolving the extract in distilled water, a slight turbidness was observable through the solution; this was removed by filtration, and treated with boiling alcohol; as it cooled there were deposited crystals free from colour, which dissolved slowly in nitric acid, giving it a yellow tinge, proving it to be narcotine.

To the solution of the watery extract, twelve fluid ounces of alcohol were now added, causing considerable turbidness; five fluid drachms of water of ammonia, specific gravity .952, previously mixed with two fluid ounces of alcohol, were next added, and the whole agitated; a brown precipitate, together with a small quantity of minute crystals gradually subsided, the mixture was allowed to remain undisturbed fifteen hours. when six drachms more ammonia were added, mixed with alcohol as before, and the mixture again agitated. Allowing sufficient time to elapse for the formation of crystals, the liquor was decanted, the precipitate collected on a filter and carefully dried by a heat of about 65°; it weighed 135 grains, a part of which was the colouring matter thrown down by the first addition of ammonia. The ammoniacal waters, upon standing a few days, deposited a fresh portion of crystals, weighing, when dried 22 grains.

To free the morphia from colouring matter and other impurities, the two precipitates were dissolved in dilute sulphuric acid; animal charcoal, purified with hydrochloric acid, being added, the whole was submitted to ebullition; the filtered solution was allowed to stand till it became cold, and then neutralized with magnesia; the precipitate was thrown on a filter, washed with cold distilled water, and dried; it was next boiled in three ounces of alcohol 35°, and the solution filtered while hot; as it cooled, crystals were deposited, which when dried, weighed 41 grains; by testing they proved to be morphia, producing, with nitric acid, a deep orange red solution.

The mother liquor, by evaporation, yielded a crystalline mass, weighing 29 grains, of a dirty nankeen colour; by a second solution in alcohol, and crystallizing, they yielded 23 grains, much less coloured; they proved to be morphia. The magnesian precipitate was again boiled in half an ounce of alcohol; the filtered solution yielded 4 grains of morphia.

In order to be satisfied whether any morphia remained in the ammoniacal liquor, it was evaporated to one-half, and one drachm of water of ammonia added; after standing some time, a thin crust formed on the bottom of the vessel; this was removed and purified with alcohol; it yielded 7 grains, making in all, 75 grains of morphia. This was twice washed with sulphuric ether, in order to free it from narcotine; it then weighed, when dried, 69 grains.

The mass which remained after exhaustion with water, was submitted to the action of alcohol, the maceration being assisted by the heat of a water bath, kept at the temperature of from 130° to 150°; the first portion of alcohol was decanted, and another added; finally, the marc was washed with alcohol until it ceased to yield colour; the several tinctures were mixed and evaporated; at first an oily substance was deposited; after that a resinous extract. The first was insoluble in water, soluble in ether, having an unctuous, sticky feel; the second portion, partly soluble in alcohol 39°; the rest insoluble in ether, but soluble in boiling water; nothing of a crystalline nature was procured from the alcoholic extract.

The marc was next digested in ether; the solution when filtered and evaporated, deposited, first, a slightly coloured unctuous matter, resembling caoutchouc; secondly, crystals nearly free from colour, producing a yellow solution with ni-

tric acid, indicating narcotine, and lastly, a reddish brown mass of a viscid consistence, analagous to wax associated with a fixed oil.

Experiment 2d. Two hundred and fifty grains, reduced to powder were digested in three ounces of distilled vinegar, specific gravity 1.011, eight days; the result was a highly coloured solution, having a specific gravity 1.059; the dregs were a second time digested in distilled vinegar, and the two filtered solutions mixed, the acid of the vinegar was neutralized with water of ammonia, and one and a half drachms more diluted with half an ounce of alcohol, were thrown into the solution which was well agitated; upon standing, a copious precipitate, of a light brown colour, fell down. This precipitate was collected, washed with cold water, dried and boiled in alcohol, 35°; the hot filtered solution, by evaporation, yielded 14 grains of morphia, somewhat coloured; after being reduced to powder and washed with other, they weighed 11 grains.

Oil of turpentine, by standing on the dregs a few days, occasionally assisted by the heat of a sand bath, acquired a brown colour; by evaporation, it yielded a matter similar to the etherial deposit mentioned in the last; it was inflammable, producing much smoke.

Experiment 3d. Three hundred grains, coarsely powdered, were acted on by one ounce distilled water, until completely divided; six ounces diluted alcohol were added, the maceration continued ten days, the tincture filtered, and the dregs washed with two ounces diluted alcohol, passed and repassed; the two tinctures were mixed and evaporated. The extract, dissolved in alcohol diluted with twice its weight of water, formed a clear solution; after standing a short time, however, it deposited a number of crystals; these were collected on a filter and dried; they weighed 5 grains, and proved to be narcotine.

The solution of the extract was boiled a few minutes with thirty grains of recently calcined magnesia, allowed to cool, and then filtered. By purification, first with alcohol and afterward with ether, but 10 grains of morphia were obtained. Experiment 4th. One hundred grains, finely pulverized, were digested in ether for several days; the solution, unlike the one produced by the action of the same solvent on the dregs in Experiment, No. 1, was scarcely coloured, it yielded, by evaporation, about 4 grains narcotine, and a peculiar substance of an oily consistence, quite fluid, without odour, and nearly colourless, but possessing a very acrid, biting taste, comparable to that of tincture of capsicum, insoluble in water, soluble in alcohol, weighed 13 grains. The piece upon which the two last experiments were performed was of a very dark colour, the surface having a more decidedly greasy feel, though that characteristic was observable in all that I examined.

To satisfy myself more fully of the value of the article, I experimented on 300 grains of the Turkey opium of the shops, and obtained by the same process as Experiment No. 2, 26 grains of tolerably pure morphia, and 9 grains more coloured.

The residuum of the opium, Experiment No. 3, when boiled in water and dried, weighed 80 grains, showing a loss of seventy-three and a third per cent., and the dregs of 4922 grains of Turkey opium, from which laudanum had been made, after similar treatment, weighed 1312 grains, being a loss precisely in the same proportion, proving the assertion made by the dealers in Egyptian opium, that it dissolves more perfectly in diluted alcohol, and consequently leaving less sediment, is incorrect.

One hundred parts yielded to water 55 of a friable extract, and to alcohol 20 parts soft extract.

The amount of morphia usually obtained from opium is stated in the books to be from nine to fourteen per cent. Guibourt got from Egyptian opium 14.5 impure morphia, and the article mentioned as having been analyzed by J. Scattergood, yielded about five per cent. Now, the amount obtained from the article under consideration, containing impurities, such as colouring matter, narcotine &c. was a little over seven per cent., and the average amount of the first three experiments, after purification with alcohol and ether, 3.55 per cent.

By the preceding comparison, it is evident that the drug now vended as Egyptian opium, contains less morphia by more than one-half, than the Egyptian opium of Guibourt and other varieties. Therefore, should the parcels hereafter imported be of the same quality with that now for sale here, it is important that the comparative virtues of the article should be generally known, both for the sake of certainty in medical practice, and because it is said it is likely to be brought into more general use.

ART. II-ADULTERATION OF PROTO-CHLORIDE OF MERCURY.

By JAMES H. HART, M. D.

Extract from thesis. New York Coll. Pharm.

This important chemical is most frequently contaminated with the accidental admixture of corrosive sublimate; and as calomel is one of the medicines perhaps as frequently prescribed by the physician as any article in the materia medica, I think it may claim our notice with great propriety.

I have frequently heard of the injurious consequences which have arisen from the exhibition of calomel carelessly prepared, and Dr. Francis in his learned dissertation on mercury, asserts that "a small dose of calomel, given in the infantile state, has been followed by convulsions and sanguineous discharges from the alimentary canal," which, as calomel when pure is a perfectly mild powder, may be safely attributable to the *impurity* of the medicine, and I am informed by a respectable physician, Dr. S. C. Roe, of this city, that he recently witnessed a most violent case of gastro-enteritis, caused by the exhibition of this medicine sophisticated with corrosive sublimate, and he is so well convinced that the calomel uniformly sold, is not sufficiently pure for internal use, that he is in the constant habit of rewashing all that he

uses in his own practice. It is, however, to be hoped that the doctor's sweeping suspicions are for the most part incorrect. I have myself subjected several parcels to the ordinary chemical tests, and have discovered minute portions of corrosive sublimate in the proportion of one in four specimens.

The difficulty of divesting calomel entirely of corrosive sublimate, I attribute to the impossibility of reducing calomel, made in the ordinary way, to a sufficiently fine powder, and consequently corrosive sublimate adheres to it with great tenacity.

I have recently made, in conjunction with Professor Ellet, of Columbia College, a most excellent article, by a process similar to that of Messrs. Howard and Jewel, and somewhat varied from the usual method, which possesses the important advantage of reducing the calomel to the minutest possible division. It consists in subliming calomel into an atmosphere of steam. The ingredients are put into a short necked earthen retort, which is attached to a receiver, having an aperture at opposite sides and one at the top.* A retort containing water is fitted to the opposite opening, and heat is applied simultaneously to both retorts, when the vapour of calomel and the steam come in contact before they are condensed, which prevents the mass from becoming solid. Calomel made by this process is perfectly pulverulent, of a pearly whiteness, and very pure.

To determine the presence of corrosive sublimate in calomel, digest in ten times its weight of boiling water, and filter; of the filtered solution, a drop or two may be placed on a gold coin, and its upper surface touched with one extremity of an iron or zinc wire, whose other extremity is in contact with some other part of the gold, so as to form a galvanic circle. If the solution contain mercury, its presence will be determined by its deposition on the surface of the gold, which it whitens. As no other soluble preparation of mercury is likely to be present in calomel, the above experiment may be generally considered as indicating corrosive sublimate. To insure absolute certainty another portion of the liquid may be

^{*} The opening at the top is for vent.

mixed with nitrate of silver, which, in solutions of corrosive sublimate, will produce a white precipitate, insoluble in nitric acid, but soluble in aqua ammonia. Or "a drop of nitrate of tin, when added to a solution of corrosive sublimate, will precipitate of a dark brown colour, the three millionth part of a grain."

ADULTERATIONS OF SULPHATE OF MAGNESIA.

Sulphate of magnesia is most frequently adulterated with fine crystals of sulphate of soda, sometimes with muriate of magnesia, and occasionally with sulphate of iron.

To detect sulphate of soda, dissolve one hundred grains of the suspected salt in distilled water, and add an equal weight of sub-carbonate of soda; boil this and wash and dry the precipitate obtained, which, if the salt be genuine, will weigh exactly thirty-four grains; if less than this it is impure; or the solution of the pure salt will give no precipitate with carbonate of potass. The presence of muriate of magnesia may be known by the disengagement of chlorine when sulphuric acid is added to the salt; or by its deliquescence, when exposed to the atmosphere. On the contrary, if epsom salts be pure, on being exposed to the air they will effloresce.

I have seen some specimens of the article contain sulphate of iron, which I detected with tincture of galls and also with ferrocyanate of potass. Epsom salts, adulterated with sulphate of iron, may be completely purified by adding carbonate of magnesia to the solution; a double decomposition takes place, the sulphuric acid of the sulphate of iron unites with the magnesia and forms sulphate of magnesia, and the carbonic acid of the carbonate of magnesia combines with the iron and forms carbonate of iron, which is precipitated.

I am informed that some experiments have been made by the New York Chemical Manufacturing Company with the magnesian earth called serpentine, which is very abundant at Hoboken, with the view of making epsom salts, but which failed, on account of the difficulty of separating the iron with which it is impregnated. If they had been acquainted with the simple process just mentioned, I have no hesitation in saying that they would have succeeded.

ADULTERATIONS OF CALCINED MAGNESIA.

Magnesia is commonly adulterated with flour, chalk, lime

and gypsum.

Flour may be detected by its burning when thrown upon red hot iron or coals; or its presence may be proved by adding to the specimen an aqueous solution of iodine, when if it contain flour a blue compound will be formed.

Chalk, by dissolving it in nitric acid, and precipitating with

sub-carbonate of ammonia.

Lime may be detected by dissolving it in dilute sulphuric

acid, and precipitating with oxalate of ammonia.

Gypsum may be discovered by boiling the suspected magnesia in distilled water, and adding oxalate of ammonia, which will precipitate oxalate of lime; or by adding muriate of barytes, we will have a precipitate of sulphate of barytes.

I have ascertained by experiments that mixtures containing magnesia, adulterated with calcined sulphate of lime, after standing short time, will become solid. The circumstance which led to these experiments was an article by an apothecary, in the twelfth number of the Journal of the Phila-

delphia College of Pharmacy, vol. iii. p. 290.

At the time this communication appeared, it gave rise to some speculations amongst some of the members of this College, and we, with the Philadelphia apothecary, were unable to account for the "singular change," and a number of experiments were instituted by Professor Rogers, Mr. Geo. D. Coggeshall and myself, with the view of ascertaining the cause of the phenomenon. We prepared the mixture according to the above formula, and also varied the ingredients in every variety of proportion, but a permanently this mixture was uniformly the result.

Recollecting that anhydrous sulphate of lime becomes solid when mixed with water, I suspected that the magnesia employed by the apothecary was adulterated with it, and my suspicions have been confirmed by subsequent experiments. I made several mixtures according to the above recipe and added to each a quantity of calcined sulphate of lime in various proportions, and in two or three days the mixture at the bottom became quite hard.

By these experiments I have arrived at the conclusion that the magnesia employed by the apothecary must have been adulterated with a large quantity of sulphate of lime.

We would probably have the same result by mixing pure lime with the magnesia and adding to the mixture a small quantity of sulphuric acid. It is probable, therefore, that if the magnesia of the apothecary was not adulterated with sulphate of lime, it contained pure lime, and the vinegar employed in making his syrup of squills must have been largely contaminated with sulphuric acid.

ART. III -ON ADULTERATIONS OF CERTAIN MEDICINES.

By OLIVER HULL.

Read before the Board of Trustees of the College of Pharmacy, of the city of New York, Feb. 6th, 1835.

The sophistication of the materials used in medicine is a species of fraud of the most culpable kind. The purchaser is not only deprived of a portion of his property unjustly, but the health and life of the patient is endangered or destroyed. This evil however exists to a very alarming extent. Among a number of instances which have recently come to my knowledge are the following:—Equal parts of alum and tartaric acid have been ground together, and sold as powdered tartaric acid. Equal parts of rhubarb and American colombo root, with a little gamboge, have been powdered to-

gether, and sold as powdered rhubarb. A very extensive drug dealer in this city, as I am credibly informed, has for several years past, sold as powdered ipecac, about equal parts of ipecac and sarsaparilla powdered and mixed together. Cream of tartar and a little tartaric acid have been mixed, and sold as pure tartaric acid. Rhubarb and common Peruvian bark have been mixed, and sold as powdered rhubarb. All the valuable essential oils afford easy and too tempting opportunities to a base spirit of cupidity, not to have been adulterated to a very great extent. They have consequently been mixed with other essential oils of cheaper price, with alcohol, with spirits of turpentine, and with fixed oils. Castor oil when previously mixed with an essential oil, will dissolve in alcohol of the ordinary strength. A sample of oil of peppermint, offered for sale, and which dissolved in alcohol, I found on evaporation to contain one third part of castor oil. A sample of oil of winter green consisted of seven-eighths of castor oil to one-eighth of winter green oil. Castor oil or any other fixed oil may be easily detected by moistening paper with the suspected oil and drying it by a moderate heat. The fixed oils will not evaporate except by a strong heat, and will consequently leave the paper greasy, when applied only to a moderate heat. On mixing a suspected lot of very thin oil of caraway with water, I found it to diminish 45 per cent.; showing that it contained that proportion of alcohol, which was abstracted and mixed with the water. A specimen of oil of peppermint I found to contain one-fifth per cent. of alcohol. I have been informed that castor oil has been mixed with purified whale oil, and sold as castor oil. Foreign oils, as well as those of domestic manufacture, are frequently very largely adulterated with spirits of turpentine. Several lots of oil of garden lavender and oil of thyme, which I examined, contained 50 and even 75 per cent. of spirits of turpentine, which appeared only to diminish the perfume without communicating any smell of the turpentine. Specimens of oil of penny royal and oil of peppermint, I found to contain 50 per cent. of spirits of turpentine, without communicating its smell. Spirits of turpentine being easily soluble in alcohol is difficult of detection; but

the circumstance of its being less soluble in alcohol of a moderate proof than most of the essential oils, furnishes a means of detection, if the experiment is conducted with care. Two samples of oil of peppermint were submitted for examinaation and resulted in both cases alike. I put 20 minims of the suspected oil into a tall drop measure, with 20 minims of alcohol of 30 per cent. proof. They mixed freely, making a transparent solution, I then added two drops of water and shook up the mixtures, it subsided into two parts, showing ten minims of a transparent fluid in the bottom of the glass, and 32 minums of another transparent fluid, occupying the upper part of the glass; I then added 8 minims of water and shook up the mixture, which separated into 30 minims of a transparent fluid floating at top. My conclusion from this experiment is that the specimen of oil consisted of equal parts of spirits of turpentine and oil of peppermint, and that in the first instance the alcohol was of sufficient strength to dissolve this mixture; but on mixing it with two drops of water it dissolved only the oil of peppermint, rejecting the turpentine which subsided to the bottom, by its greater specific gravity. After being further diluted with 10 minims of water the alcohol was too weak to dissolve the oil of peppermint, which again mixed with the turpentine, having greater affinity for it than for the diluted alcohol. This conclusion I have strengthened by mixing various proportions of pure essential oil and spirits of turpentine, and by treating them as above detailed, have separated them again into their actual proportions.

ART. IV .- ON ACETATE OF ZINC. By AMBROGE SMITH.

(Extract from thesis. Phil. Coll. Phar.)

Acetate of Zinc, in crystals, was first described by Glauber. A solution of this salt, obtained by the mutual decomposition of acetate of lead and sulphate of zinc, has long been used medicinally, and is officinal in the Edinburgh College of Pharmacy. In the crystalline state it was first made officinal, in the U.S. Pharmacopæia of 1830. It is prepared according to this pharmacopæia, by mixing solutions of acetate of lead and sulphate of zinc, filtering and evaporating the clear liquid. The formula is as follows:

"Take of sulphate of zinc 6 oz. acetate of lead 8 oz. distilled water, a gallon.

Dissolve the sulphate of zinc and acetate of lead severally, in four pints of the distilled water; then mix the solutions and filter through paper; lastly evaporate the filtered liquor so that upon cooling it may crystallize." Acetate of lead is composed of one equivalent of acetic acid, 51, one of protoxide of lead, 112, and three of water, 27=190. Sulphate of zinc of one equivalent of sulphuric acid, 40, one of oxide of zinc, 42, and seven of water, 63=145. In this process one equivalent of acetic acid, 51, from the acetate of lead unites with one equivalent of oxide of zinc, 42, and seven of water, 63, forming one equivalent of crystallized acetate of zinc, 156; and one equivalent of sulphuric acid, 40, from the sulphate of zinc unites with the equivalent of oxide of lead, 112, liberated by the decomposition of the acetate, forming one equivalent of sulphate of lead, 152, which is separated by filtra-Three of the ten equivalents of water of crystallization, contained in the salts employed, are of course lost in the pro-The equivalent proportion of acetate of lead for the six ounces sulphate of zinc employed is 7 oz. 6 drs. 53.8 grs., so that a slight excess of the acetate is directed by the Pharmacopæia.

The quantity of acetate of zinc yielded ought to be to the sulphate employed in the proportion of 156 to 145, which

gives for the 6 oz., 6 oz. 3 dr. 38.48 grs.

While evaporating a solution of acetate of zinc obtained according to the above process, at a boiling heat, a considerable quantity of a white powder was found to precipitate. This powder when heated before a blow pipe assumed a vellow colour, which it lost on cooling. It dissolved in acids without effervescence and without giving off any odour of acetic acid, and the solution gave a white precipitate with hydrosulphate of ammonia and with the alkalies. The caustic alkalies when in excess redissolved the precipitate. The alkaline carbonates gave precipitates which were insoluble in an excess of the precipitant. When its solution in dilute sulphuric acid was evaporated, small crystals formed, which were four sided prisms, having all the properties of sulphate of The powder then was simply oxide of zinc, from which the acetic acid had been driven off by the too great heat employed in evaporating. The solution ought therefore to be evaporated with a moderate heat; when it becomes concentrated a water bath should be employed. A boiling heat does not decompose the salt when the solution is weak.

The quantity of water directed for dissolving the sulphate of zinc and acetate of lead appearing larger than necessary, in order to shorten the subsequent evaporation one half was used, and acetate of zinc prepared (with this exception) according to the proportions directed in the Pharmacopæia, as

follows:

Sulphate of zinc, 600 parts, Acetate of lead, 800 parts, Distilled water, 6400 parts.

The salts were dissolved separately in the water, and the solutions mixed. Six hundred and twenty-eight parts of sulphate of lead (when dried) were separated by a filter; six hundred and forty-two parts of crystallized acetate of zinc were obtained after evaporation. During the evaporation, minute yellow crystalline grains formed in the liquid. These small crystals were separated by a filter, and treated with

nitric acid, which dissolved the yellow colour, leaving a white powder unacted on. The acid solution gave a deep blue colour when tested with ferrocyanate of potassa. The white powder unacted on by the acid, was mixed with charcoal and heated before a blowpipe; vapours of sulphuric acid were given off, and small globules of metallic lead formed. These crystals are therefore sulphate of lead, coloured by adhering oxide of iron. If their weight (five parts) be added to the sulphate of lead, separated by the filter, it will give 633 parts as the whole of this salt formed.

Another mode of procuring the salt is by decomposing acetate of lead in solution by metallic zinc. Lead precipitates in crystals, and the zinc uniting with acetic acid and oxygen, occupies its place in solution. The equivalent proportions are, one equivalent of zinc 34, and one equivalent of acetate of lead 190. If 8 ounces of acetate of lead are used, the quantity of zinc required, according to theory, would be 1 ounce, 3 drams, 27 grains.

The stronger the solution of acetate of lead, the more rapid, of course, would be its action on the zinc. Acetate of lead dissolves in about four times its weight of water to form a saturated solution. This would then be the proper proportion of water.

In order to ascertain the most eligible proportions of the acetate of lead and of zinc, the following experiments were made, the temperature in each instance being the same, above 60°;

1st.	Acetate of lead	800 parts,
	Mossy* zinc	400 parts,
	Distilled water	3200 parts.

After standing a week, the liquid still showed traces of lead when tested with sulphuretted hydrogen.

2d.	Acetate of lead	800 parts,
	Granulated zinc	200 parts,
	Distilled water	3200 parts.

Four or five days were required for the complete decomposition of the acetate of lead.

^{*} Made by pouring melted zinc into water.

3d.	Acetate of lead	800	parts,
State of the sale	Mossy zinc	600	parts,
1990年	Distilled water	3200	parts.
About twelve	hours required.	1.37	
	Acetate of lead	800	parts,
· 中华的一种中国	Granulated zinc	300	parts,
	Distilled water	3200	parts.
About eight h	ours required.	Stores.	100
5th.	Acetate of lead	800	parts,

Distilled water In six hours no trace discoverable.

Mossy zinc

6th.	Acetate of lead	800 parts,
	Granulated zinc	400 parts,
100 B	Distilled water	3200 parts,

800 parts,

3200 parts.

In six hours no trace discoverable.

In all these experiments, a larger proportion of zinc is employed than that indicated by the atomic weights. would no doubt answer, but the time required in the process would be proportionally increased. Granulated zinc acts with rather greater rapidity than twice its weight of mossy zinc. Although a greater quantity is required, it is best to use mossy zinc, as it is much more easily made, and is less apt to contain impurities than the granulated. It will be generally most convenient to use a large proportion of zinc, in order that it may not require much time to decompose the acetate of lead. The proportions probably preferable are those used in Experiment 5; or if given in definite quantities as follows:

> Acetate of lead 8 oz. Mossy zinc 8 oz. Distilled water 2 pints.*

Dissolve the acetate of lead in the water, and add the zinc; allow it to stand until the solution gives a pure white precipitate when tested with sulphuretted hydrogen; then pour off

^{*} This quantity of water, though it is rather less than four times the weight of the acetate of lead, is sufficient to dissolve it.

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the clear liquor and evaporate, so that upon cooling it may crystallize.

This process is certainly preferable to that by double decomposition. The product is purer, the materials also are cheaper, and the manipulation easier. The quantity of acetate of zinc, which according to the equivalent proportions these quantities should yield is 6.5 oz. 32.84 grs.; but I have not been able to obtain from 8 oz. of the acetate of lead of commerce more than 5 oz. This deficiency is probably because the acetate of lead did not contain its full complement of acetic acid, owing in part to a small quantity of carbonate which the commercial salt usually contains, but chiefly to its having been partially changed into a basic sesqui-acetate by exposure.

Acetate of zinc may also be formed by direct combination between acetic acid and zinc, or its oxide, or by decomposing the carbonate by acetic acid. Neither of these modes however, is available in procuring the salt for commercial pur-

poses.

Acetate of zinc, when recently crystallized from a solution which has not been too far evaporated, is in colourless transparent plates, usually hexagonal, sometimes though rarely, rhombic, which are slightly efflorescent in dry air. As found in the shops, it is in opaque white scales of a micaceous or rather talcose appearance, having an astringent, metallic, very disagreeable taste. One ounce of water at the temperature of 60° dissolved 190 grains. One ounce of alcohol of sp. gr. .835, dissolved twelve grains. It is much more soluble with the aid of heat, boiling water dissolving more than sixteen times its weight, boiling alcohol more than four times. Its specific gravity was found by weighing it in a saturated solution, to be 1.6975, by weighing it in ether, 1.696. Acetate of zinc is decomposed by the stronger acids, which unite with the oxide of zinc, liberating the acetic acid. Its solution is precipitated by the alkalies and their carbonates. The precipitates with the caustic alkalies redissolve in an excess of the precipitant. It also forms precipitates with lime and baryta waters, and with infusion of galls. When exposed to heat, decomposition

commences before all its water of crystallization is given off, and the vapour which rises takes fire on the approach of a lighted taper, and burns with a beautiful flame, the interior of which is red, the exterior blue, green and white.

When a portion of it was submitted to destructive distillation, a liquid of a slight yellowish colour condensed in the receiver, which was found to consist of water, acetic acid and pyro-acetic spirit. Oxide of zinc, together with a little charcoal, remained in the retort.

ART. V-ON AMERICAN SENNA. By James J. Martin.

Extract from thesis. Phil. Coll. Pharm.

This is the Cassia Marilandica, of Willdenow, belonging to the class decandira, order monogynia, natural order Leguminosæ. Tournefort and Gærtner separated those with cylindrical and pulpy pods, reserving to them the name of cassia; whilst the others were designated by that of senna. Persoon was dissatisfied with this arrangement, and gave the name of cathartocarpus, to the first set, and allowed the others to remain, under the appellation of cassia. This deviation was deemed superfluous; and as the plants so nearly resemble each other in most respects, it would prevent confusion by allowing them to remain under the old title of cassia. This preference appears to be given by our national pharmacopæia, to those species therein noticed.

The Cassia Marilandica is an indigenous plant, and grows abundantly in most parts of the United States, from Massachusetts to Missouri and Georgia, and is very common in the western states. It grows most plentifully and luxuriantly in the vicinity of rivers and ponds, preferring a low moist soil.

It is cultivated to some extent for medical purposes to the northward by the Shakers; and it is from them the market is chiefly supplied. The leaves are the officinal portion; and these should be collected about the beginning of September,

that being the time at which the pods are ripe; they contain a portion of the active principle as well as the leaves; it appearing at this period to be most widely disseminated over the plant. It is mentioned by Rafinesque that American senna is more efficacious than that of Egypt; it is however much inferior to the Alexandrian, requiring a larger quantity to produce similar effects. As most plants growing in dry and exposed situations, are more active than those growing in rich, moist soils, it is probable that the inferiority of the American senna to the imported, is owing to this cause; and it might, under similar circumstances of growth, be equal to that in strength. It has been introduced into Europe: the first that reached there was sent from the state of Maryland, and hence its specific name. The leaves, as they occur in the shops, are packed in oblong cakes, as is usual with most plants derived from the Shakers. They are from one to two inches in length, and near half an inch in breadth, thin and pliable, of a pale green colour; the odour is slightly analogous to that of imported senna, though by no means so nauseous. Its effects on the system are similar to those produced by the imported.

Its medical virtues are imparted to water by decoction or infusion, and to alcohol. A tincture may be formed with diluted alcohol, which is, like the infusion, of a reddish brown colour. Alcohol and ether, digested on the powdered leaves, become of a deep olive green colour. The infusion and decoction become turbid on exposure to the air, owing to the conversion of the extractive matter into apotheme.

The medicine is best administered in the form of infusion; the following formula will give a preparation equal in strength to that directed by the U.S. Pharmacopæia, from the imported, and it may, under all circumstances, be substituted for that. Take of

American senna, $1\frac{1}{2}$ oz. Coriander seeds, bruised, 1 drachm. Boiling water, 1 pint,

Macerate in a covered vessel for one hour, and strain.

With a view of demonstrating the analogy existing be-

tween the two kinds of senna, I performed the following experiments:

1. To a filtered decoction of the leaves, a solution of acetate of lead was added, so long as a precipitate fell; this was separated by filtration: the excess of acetate of lead, by hydro-sulphuric acid; sulphuret of lead by another filtration: this solution was evaporated to dryness, and treated with pure alcohol, the alcoholic solution evaporated, and then treated with sulphuric acid, to decompose the acetate of potassa which it contains: the sulphate of potassa is separated by filtration: the excess of sulphuric acid by acetate of lead: the excess of acetate of lead by hydrosulphuric acid: sulphuret of lead by filtration; the alcoholic solution now evaporated, yielded the active matter of the plant.

2. Macerated the leaves for several hours in cold water; the liquid was separated by means of a sieve, and filtered. On being heated to ebullition it becomes turbid: another portion yielded a grayish precipitate, with a solution of corrosive sublimate.

3. The leaves were digested in alcohol until every thing soluble was taken up, expressed and dried; they were then treated with cold water. The solution thus obtained, gave a flocculent precipitate with acetate of lead; and a brownish precipitate with permuriate of iron. On concentrating a portion of the solution, it yielded a precipitate on the addition of alcohol.

4. The residue of the leaves from last experiment, were treated with boiling water; this solution yielded a blue precipitate with tincture of iodine; subacetate of lead threw down a whitish precipitate.

5. Macerated the leaves in cold water until every thing soluble in that menstruum was taken up; expressed and dried them. They were now treated with alcohol; the alcoholic solution filtered and evaporated; the substance left was treated with boiling water, which took up a small quantity of soluble matter. The residue was of a deep green colour, soluble in alcohol and ether, slightly soluble in boiling water; insoluble in cold water.

On adding to the solution a metallic salt, and then a solution of a fixed alkali, the oxide of the metal was thrown down with the green matter, in the form of a lake.

6. The solution obtained in last experiment, with boiling water, on being evaporated, yielded a yellow colouring matter.

- 7. A portion of the leaves were introduced into a retort, heated by means of an oil bath, and water added to them; this was distilled until it came away inodorous; the exhausted leaves were replaced by others; and the liquid redistilled from them; this operation was repeated till numerous fine particles of oil came over with the water.
- 8. Digested the residue of the leaves obtained in experiment 5th, in sulphuric ether; evaporated the etherial solution, and obtained a yellow substance, which left a greasy stain on paper, and was insoluble in alcohol.
- 9. A tincture made with diluted alcohol, became turbid on the addition of water; the precipitate was separated by filtration; the filter was digested in alcohol, which dissolved the precipitate; on the addition of water, the resin was again thrown down.
- 10. Having digested the leaves severally, in a solution of caustic potassa and dilute muriatic acid, a substance was obtained possessing the properties of *lignin*.
- 11. Incinerated the leaves, and treated the residue with water; a solution was obtained which effervesced with acids; on concentrating it, it gave a white precipitate with a solution of tartaric acid, which was dissolved by heating the water to ebullition, and again precipitated on cooling.

A portion of the liquid yielded a precipitate with a solution of chloride of platinum.

12. The insoluble residue of last experiment was treated with diluted muriatic acid, which occasioned considerable effervescence. The solution obtained gave a precipitate with oxalate of ammonia and sulphuric acid; the last did not occur till several hours afterwards.

From the foregoing experiments we may infer that American senna contains, 1, Active principle of the plant; 2, Albumen; 3, Mucilage; 4, Starch; 5, Chlorophylle; 6, Yellow

colouring matter; 7, Volatile oil; 8, Fatty matter; 9, Resin; 10, Lignin; 11, Potassa; 12, Lime.

By comparing these constituents with those found in imported senna, it will be seen that the composition is very similar. Several experiments were made to ascertain the presence of other substances, supposed to exist in the plant, but without avail. The pods were found to contain the active, and most probably the other principles of the plant; but the quantity of them was too small to operate on to advantage.

One thousand parts of the leaves give 396 parts of watery and 160 parts of alcoholic extract: inversely, 300 of alcoholic, and 256 of watery extract; making 140 parts of extractive matter.

The extractive matter may be obtained by acting on the watery extract, (dried,) with pure alcohol; it is of a dark reddish brown colour, and possesses the virtues of the plant.

In solution it is affected by the atmospheric air, when exposed to its influence; but does not become turbid in a vial that is closely stopped.

The active constituent is of a yellowish red colour, having the taste and medicinal properties of the plant, in a concentrated degree. Its colour is rather lighter than that of cathartin, and its taste but slightly similar; its odour is entirely different. Forty grains produced similar effects on the system with an equal quantity of cathartin. It is, like that substance, deliquescent; its watery solution is not affected by exposure to the air, tartrate of antimony, or acetate of lead; but is precipitated by an infusion of galls, and subacetate of lead. It is, in all probability, a modification of the substance, the active principle of imported senna, and as such can hardly be ranked as a distinct proximate principle. When taken into the system, it produces a griping effect, which is obviated by combining with it a saline substance; this acts by qualifying the system, and produces no effect on the principle, as this was obtained pure from a decoction of the leaves, formed with the addition of a salt.

On macerating the leaves for several days in water, in a warm room, they were found to have undergone putrefactive fermentation, owing to the decomposition of the albumen which they contain.

The manner in which experiment 4th was conducted appears necessary, as in several attempts the existence of starch was not shown by the addition of tincture of iodine to the decoction, decolourized by animal charcoal; the quantity existing is very minute.

The yellow colouring matter may be most readily obtained by acting on the extractive matter with sulphuric ether, and evaporating the solution; it has the following properties: it is soluble in alcohol, ether, boiling water and the acids; precipitated from its solutions by alkalies of a brick red colour, and restored to its solution unchanged by the addition of an acid.

Water distilled from the leaves has a nauseous taste; the volatile oil is colourless, and possesses the peculiar odour of the plant, and this odour depends entirely on the volatile oil, as it is not possessed by the active principle.

On treating the powdered leaves with sulphuric ether, and evaporating the solution, there was formed a solid substance; also, floating on the surface of this, a peculiar oily substance, of an exceedingly acrid taste; it very soon united with the mass. The experiment was repeated several times for the purpose of obtaining this supposed fixed oil, but without success. By taking away every thing soluble in alcohol from the green mass, there remained the yellow fatty substance before noticed; this, of course, is insoluble in alcohol, and appears to be the union of wax with fixed oil.

The residuary leaves from the preceding process yielded nothing to boiling ether.

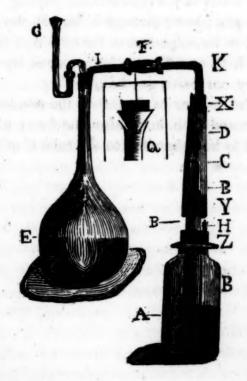
Cathartin, the term applied to the active principle of senna, is indefinite; other cathartic principles being equally entitled to it. It is most probable this principle exists, more or less modified, in all the cathartic species of cassia. On this supposition I would propose the term cassin, (changing the last letter of the generic name) as a substitute,

ART. VI.-A SUBSTITUTE FOR WOLFE'S APPARATUS.

By P. T Tyson, Baltimore.

Most persons who have had frequent occasion for Wolfe's Apparatus, and the substitutes proposed for it, complain of the trouble and inconvenience attending the use of them. The annexed sketch represents a contrivance which seems better adapted to the use of the chemist and pharmaceutist in most cases, than those generally used.

The apothecary will find it well adapted to the manufacture of hydrocyanic acid, when this is made by treating the bicyanide of mercury with hydro-sulphuric acid.



The vessel A may be a bottle of any convenient size. B is the beak of a broken retort, the large end of which should be of such dimensions as merely to permit it to be introduced through the mouth of the bottle A, it should reach nearly to the Vol. I.—No. I.

bottom: at Zit is passed through a cork well fitted into the mouth of the bottle. The smaller end of the beak B, has a cork fitted into it, through which a small tube C (bent in an angle at its upper extremity) is passed. D is another retort beak, or a bottle with its bottom cut off, the larger end of which, Y, is fitted by means of a cork to the smaller end of B. At X a small bent tube K is passed through a cork fitted into D. The cork in the mouth of the flask E, has the end of the safety tube G passed through it, and also a bent tube I which is connected by a tube of caoutchouc with the bent tube K. At H is a valve to prevent any explosion when the extrication of gas is too rapid to be absorbed; this valve is represented at Q, enlarged.

The gas being generated in the flask E, passes through the bent tubes into D, where the aqueous vapour is condensed; the resulting water is prevented from passing into B by the tube D. The gas passes through C and B, the latter containing the liquid to be subjected to the action of the gas.

The tubes I, F, and K may be replaced by a single glass

tube, if a very corrosive gas be used.

If a series of bottles be desirable, the condensing vessel D may be dispensed with, in all after the first; a tube may proceed from H to be connected to the tube C of the succeeding bottle.

ART. VII.—ON ADULTERATION OF HYDRIODATE OF POTASH &c. By F. & N. G. CARNES, New York.

In reply to Art. LXIV, Vol. VI, page 287.

OBSERVING that our names have been used in the last number of the Journal, in a paper on Hydriodate of Potash, by Dr. Adamson, and that it may be inferred from what is there stated, that we sell adulterated chemicals, we feel it due to ourselves to say a few words on the subject.

That the article referred to was impure, we do not deny; but the fault is not with us, but with the druggists of this and other cities, who will have cheap hydriodate of potash, without regard to purity. We were among the first of those who imported this article from Paris, years ago, when we sold it in its pure state, at from seventy-five to eighty-seven and a half cents per ounce; a price sufficient to pay a fair profit; but since that time, such has been the competition of trade, the influx of Frenchmen with adventures of inferior articles, and above all, the desire of our druggists throughout the country, to have cheap chemicals, that they might undersell each other, that we have been obliged in self defence, to import them of an inferior quality, or lose custom.

But this is not the only article which is wanted cheap. Morphine, strychnine, iodine, and various other valuable substances, which under no circumstances ought to be sold but in a pure state. It is not fair that we should be found fault with for selling impure articles, when purchasers themselves know that these articles cost more in Paris than they are willing to pay for them here.

To conclude, if we could be supported in importing none but pure articles, we most certainly would never sell any other: but until then, we must continue to import two qualities; one for those who want them cheap, the other for the fair dealer, who wants them good, and is willing to pay for them.

It is a fact, that we shall not import any iodine or hydriodate of potash this spring, merely because these articles are worth forty-two cents per ounce in Paris, and we are well aware that we cannot obtain more than that price here, let the quality be what it may.

ART. VIII.—ON GILLENIA TRIFOLIATA. By Charles S. Shreeve.

Extract from thesis. Phil. Coll. Pharm.

In making the following experiments, the cortical portion of superior specimens of the dried root was used. The ligneous part was rejected as being comparatively inert.

1. The decoction strikes a blue colour with the tincture of iodine, and is precipitated of a dirty white colour by subacetate of lead.

2. Upon the addition of alcohol to a cold infusion, it threw down a precipitate, indicating the presence of gum.

- 3. The decoction is of a beautiful red wine colour, having an intensely bitter taste, the odour while boiling resembling that of senega. Alcohol throws down a precipitate of a dirty white colour. This does not agree with the statement of Dr. Bigelow, who asserts that alcohol occasions no change when added to the decoction.
- 4. Three hundred and eighty grains of the powdered root were digested in f. 3iv of sulphuric ether, for three days; the etherial tincture was then filtered, and upon evaporation yielded a considerable quantity of a yellowish brown substance, which, upon examination, was found to consist principally of wax and fatty matter.
- 5. Digested a quantity of the root previously submitted to the action of ether, as in the preceding experiment, in f. Zviij of alcohol, with a moderate heat for two days, the tincture was then filtered and evaporated; the residue was of a reddish brown colour, having an intensely bitter and somewhat

nauseous taste. This was treated with water, filtered and digested with half a drachm of carbonate of magnesia, (the colour of the solution was rendered considerably deeper by this process,) and was then evaporated to dryness. The extract obtained, having a reddish brown colour and an intensely bitter taste.

6. Digested 240 grains of the powdered root in t. Živ of boiling water, acidulated with thirty drops of sulphuric acid; decanted, and treated the residue with a fresh portion of acidulated water, filtered and mixed the liquors: then added solution of subacetate of lead as long as any precipitate was afforded; filtered, and passed hydrosulphuric acid through the solution to get rid of the excess of acetate of lead, then filtered again to separate the sulphuret of lead; and the clear solution evaporated to dryness, the resulting extract was of a reddish brown colour, soluble in alcohol, insoluble in water and ether.

7. The tincture is of a beautiful red wine colour, and has a bitter, somewhat nauseous taste; it is rendered turbid by the addition of water, indicating the presence of resin.

8. Four ounces of the recently powdered root were submitted to the process recommended by M. Tilloy of Dijon, for obtaining the sulphate of quina. The substance thus obtained was of a light gray colour, and bitter, nauseous taste. It was soluble, except a small residue, in water acidulated with sulphuric acid; the solution, when evaporated yielded an extract of a somewhat granular appearance, and having more bitterness than before its solution. The quantity obtained was so small as to deprive me of the opportunity of examining further into its properties.

9. As a final experiment, I submitted a portion of the root to distillation with water; the product was slightly coloured, and had a peculiar and very disagreeable odor, with little or no taste. The root evidently contains a volatile colouring principle; this was perceptible on the sides of the beak and upper parts of the retort.

From the foregoing experiments it is probable the following are the principal constituents of Gillenia, viz.

1, Starch; 2, Gum: 3, Resin; 4, Wax; 5, Fatty matter; 6, Red colouring matter; 7, Volatile colouring matter; 8, A peculiar principle soluble in alcohol and the dilute acids, but insoluble in water and ether.

ART. IX—EXTRACT FROM A COMMUNICATION READ BEFORE THE COLLEGE OF PHARMACY OF THE CITY OF NEW YORK, ON THE ADULTERATION OF MEDICINES.

By WILLIAM L. RUSHTON.

ADULTERATION OF ACETATE OF MORPHIA.

I recently purchased of a drug house in Philadelphia an article purporting to be acetate of morphia, which was represented to be of their own preparing, and warranted perfectly pure; upon opening a vial of it, I perceived an unusual odour, which led me to suspect that it was adulterated. I submitted it to the usual tests, and could not discover that it contained a particle of morphia. I then gave a small quantity of the same article to a chemist to analyze, and received the following note:

"Dear Sir—The substance which you left with me for analysis, purporting to be acetate of morphia, does not contain either morphia or acetic acid; it is entirely composed of sulphate of lime, with a slight excess of sulphuric acid.

"Yours, &c. C."

Adulterated and damaged articles are also daily sold at auction, which require attention. Damaged rhubarb, within a few days, has been sold at five dollars a case, which will no doubt be powdered, and perhaps mixed with a little gamboge, turmeric, or some deleterious substance and find its way into some of our stores, the proprietors of which are go-

verned more by the low price of medicines than by a regard to their quality.

It is a fact well known to many of us, that the adulteration of chemicals, essential oils &c., is carried on to a great extent, the perpetration of which is not confined to New York, but extends to some of our neighbouring cities, as well as to foreign sources, which practice is so reprehensible and has become so common, that it demands our serious attention and most rigid scrutiny.

Note.—We are requested by Messrs. W. & L. Krumbhaar, the druggists alluded to in the above communication, to state that they have submitted some of the same parcel of acetate of morphia to the inspection of a distinguished chemist of this city, who, after "a careful, experimental investigation, has declared that it was of the best quality, and entitled to the confidence of the public and the profession." Mr. Cance, the manufacturer of the article in question, is also confident that the portion furnished to Mr. Rushton was identical with that examined by Dr. Mitchell. In order, however, to settle this point, Messrs. Krumbhaar have written to New York for some of the acetate sold to Mr. Rushton, which will be placed in the hands of competent persons for examination, and the results, whatever they may be, communicated in our next number.—Ep.

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ART. X .- ON SANGUINARIA CANADENSIS. BY CLEMENT J. LEE.

(Extract from thesis. Phil. Coll. Phar.)

According to Dr. Dana the active principle may be obtained, by digesting the finely powdered root in absolute alcohol, and adding to the tincture a solution of ammonia so long as it occasions any precipitate; a gray powder falls down which is to be collected and boiled in water, with some pure animal charcoal—the liquid is then filtered, and alcohol is to be digested on the matter remaining on the filter and afterwards evaporated to dryness. A white substance remains having an acid taste: this substance is the sanguinarena of Dr. Dana.

I followed up the above experiment, and obtained the active principle of the root, although in a very small quantity.

Experiment 2d. A tincture was formed by digesting Ziv of the finely powdered root, in Zviij of absolute alcohol, for six days, filtering off the tincture and adding Zviij more of absolute alcohol to the dregs, and digesting as before; a second time filtering off and mixing the tinctures together. To which was added a solution of acetate of lead, so long as any precipitate was afforded. The liquid was then filtered and the excess of lead precipitated by passing a stream of hydro-sulphuric acid through the solution. It was then filtered and slightly heated to drive off the excess of hydro-sulphuric acid. The solution was then evaporated away to about one-fourth, which united with the acetic acid, and precipitated the sanguinarena with a portion of uncombined magnesia. The precipitate was dried and treated with boiling alcohol, which dissolved out the sanguinarena, and yielded it by spontaneous evaporation. The product obtained by the above process was not entirely white, no doubt owing to some impurities. Its taste was extremely acrid; in alcohol it was very soluble, but sparingly so in water. Its alcoholic solution afforded a slight precipitate with tincture of galls, which was soluble in alcohol, but insoluble in water and ammonia. Sanguinarena is soluble in sulphuric acid, forming a beautiful red

solution. I was unable to crystallize the sulphate, owing to the small quantity upon which I operated.

Experiment 2d. Zvi of the finely powdered root were digested in zxii of alcohol: the tincture at the expiration of ten days was filtered off, to which were added f. Ziiss. of ag. ammon, the mixture was then poured into a vessel containing two pints of distilled water, when a brown matter subsided, which was collected upon a filter and carefully washed with a small quantity of distilled water, and the colouring matter removed by means of purified charcoal. It was then treated with boiling alcohol, which dissolved the sanguinarina and by cautious vaporization, the latter was obtained in a state approaching to whiteness. By exposure to atmospheric air it changed to a light yellow colour.

Experiment 4th. Ziv of the bruised root was digested in Zviij of water, for the space of two weeks, the whole was then transferred to a retort by means of a sand bath. The liquid which passed over had the odour and to a slight degree the peculiar taste of the root.

With ammonia it afforded a precipitate which was re-dissolved by the alkali in excess.

I was unable to procure any of the sanguinarina from the precipitate, but with sulphuric acid it formed a red solution, proving the presence of that salt.

Of the several processes which I have pursued for the extraction of sanguinarina from the blood root, that of experiment 3d I found to answer the best, being the most simple, easy of management, and yielding the largest quantity of the vegetable alkali.

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Selected Articles.

ART. XI.—ON THE CYANURET OF POTASSIUM AS A REMEDIAL AGENT. By Felix Bouder.

THE cyanuret of potassium has for some years past been considered as a specific in neuralgia. Whether it be applied externally or administered internally, the dose is very small, and it is of the highest importance that its composition, and of course its strength, should always be identical, as the least variation might be attended with unpleasant consequences.

From the observations of Dr. Trouvé of Caen, published in the Journal de Chimie Medicale, (x. 23,) it appears that there is a great difference in the action of moist and long prepared cyanuret of potassium, and that which is dry and recent, and that this difference may occasion dangerous results.

If to this be added all the causes which may, during or after the preparation, modify the composition of the cyanuret and always at the expense of its efficacy, it will be seen how much the preparation and use of this remedy merits the most serious attention.

It appears from the experiments of M M. Pelouse and Geiger, that a concentrated solution of cyanuret of potassium subjected to ebullition in vacuo, is decomposed by the mere elevation of temperature; so that one proportion of cyanuret acting on four proportions of water, gives rise to one proportion of ammonia which is disengaged, and to one proportion of formiate of potash.

The same solution evaporated in the air, gives rise to a slow but continued disengagement of hydrocyanic acid, and

produces carbonates of potash and ammonia, formiate of potash, a small quantity of hydrocyanate of ammonia &c., products which have no relation as to properties, with the cyanuret.

Moreover, the same cyanuret in a solid state, kept in a badly closed bottle, or one which is often opened, is transformed into hydrocyanic acid, which is disengaged, and into carbonate of potash, which is formed at the expense of the carbonic acid of the air. This transformation takes place very rapidly, when the salt is moist.

This being admitted, when we refer to the usual method of preparing the cyanuret of potassium used in medicine, which consists of dissolving and evaporating to dryness the product of a calcination of the yellow cyanuret of potassium and iron, it must be evident, that during this operation, a certain proportion of the cyanuret will be completely decomposed, and that this proportion will vary with the rapidity of the evaporation, the temperature employed, the quantity operated upon, in short, that a pure product can never be obtained, nor one which is identical with the results of other operations. Hence, in making use of a cyanuret thus prepared, a physician is always exposed to unpleasant consequences.

Suppose for instance, a physician after having prescribed a grain of the cyanuret of potassium, without obtaining the desired result, gradually increases the dose to two, three, or even four grains; if the cyanuret be moist, and has undergone a change, these four grains may be only equivalent to two grains of the pure cyanuret, and may produce a beneficial effect; but if, after having thus made use of the preparation in this state, the same patient should employ the same dose of a pure and dry cyanuret, this change doubles the strength of the remedy, and may cause the most fatal results.

There exists, however, a mode of avoiding this danger, which is by never employing for medicinal purposes, any other than the fused cyanuret.

When the retort is broken, in which the cyanuret of potas-

sium and iron have been calcined, a mass is found, formed of the cyanuret of potassium and the quadri-carburet of iron. If this mass be broken with care, we may, as is observed by M. Robiquet, separate a certain quantity of fused cyanuret, in white, compact fragments, perfectly pure, and fit for medicinal use. The cyanuret thus obtained, presents but a small surface to the action of the air, and should be the only one used in medicine, for it is the only one which can be administered with safety; but even in this form, the energy of its properties requires the most scrupulous attention on the part of the physician who prescribes it.

ART. XII .- ON THE ACTIVE PRINCIPLE OF SARSAPARILLA.

By M. POGGIALE.

M. Patotta first made known the active principle of sarsaparilla, in 1824, and gave it the name of Parigline. About the same time, another Italian physician, M. Folchi, discovered what he thought a new principle, which he named Smilacine. Few persons in France, I believe, repeated the experiments of M. Palotta, and no one took notice of those of M. Folchi. It was not until 1831 that M. Thubeuf again called the attention of chemists to this subject. He announced that he had extracted a new substance from sarsaparilla, and which he denominated salseparine. The number of these pretended active principles of sarsaparilla was further increased by a German chemist, M. Batka, who published, towards the close of 1833, an account of the discovery of an acid which he termed Parillinic acid.

Are these four substances really four new bodies, or are they only the same principles obtained by different processes! This question I shall endeavor to answer in the succeeding pages.

Before undertaking my researches, I procured sufficient

quantities of parigline, smilacine, salseparine, and parillinic acid.

I prepared the parigline according to the process of M. Palotta, by adding milk of lime to an aqueous infusion of sar-saparilla, treating the precipitate when dry with alcohol, and then distilling. By this means I obtained a very fine product.

I did not find it as easy to prepare the smilacine of M. Folchi; this physician I think deceived himself, when he announced that he had obtained appreciable quantities of this substance, by macerating one ounce of the medullary part of sarsaparilla in water, treating this infusion with animal charcoal, and evaporating it. I would state that it is impossible to extract the smallest quantity of smilacine, from an ounce of this meditullium by means of water. I separated with the greatest care the cortical substance from the medullary part, and although I operated on five kilogrammes, I obtained very little smilacine. The colour of the substance thus prepared is acted on with great difficulty by animal charcoal; but if it is treated with alcohol and charcoal, it acquires all the properties of parigline; when we reflect that water is a bad solvent of parigline, and that the meditullium furnishes very little of it, it will be readily conceived why we always obtain this substance in small quantities and in an impure state by the method of M. Folchi. But, if an infusion, or what is better, a decoction of the medullary portion of sarsaparilla, be treated with lime and alcohol, a substance is obtained identical with parigline. This same part, well bruised, and macerated in alcohol at 35°, also affords the same body.

These researches led me to examine whether the active properties of sarsaparilla resided in the cortical or medullary part of the root. Mr. Pope has asserted that the active principle was wholly confined to the cortical portion, and that the medullary was inert. This assertion I esteem erroneous. All the world may satisfy themselves that both parts contain parigline. I have treated these two portions of the root by the methods of Palotta, Folchi, Thubuef and Batka, and have

obtained the same principle from both. I must, however, allow that the medullary part furnishes the smallest quantity.

Although M. Thubeuf has not yet published an account of the method he employs to prepare salseparine, I am aware that he commences by obtaining an alcoholic tincture of the root; that he treats this tincture with animal charcoal, filters and crystallizes the salseparine. At all events, I followed this plan, and the substance I obtained possessed properties which did not differ from those of parigline. And I must also add, that this is by far the best mode of operating, as it requires less time, is less expensive, and affords a larger and more beautiful product than any other.

I also prepared the pretended parallinic acid of M. Batka, following the method of that author. This plan is very complicated, and might certainly be rendered more simple if required. I have prepared it by merely adding hydrochloric acid to a concentrated decoction of sarsaparilla. I shall, hereafter, notice the reasons which induced M. Batka to regard this substance as an acid, and will prove that they are

founded in error.

I have stated that salseparine or parigline might be obtained by several different modes of operating. I have prepared them by means of potash, magnesia, sulphuric acid &c. By boiling sarsaparilla for half an hour with calcined magnesia, drying the precipitate and treating it with alcohol, much parigline is obtained. This parigline is granulated and looks like potatoe starch. It does not present the physical properties of salseparine, but it nevertheless is identical with this substance, for by dissolving it in alcohol and carefully evaporating the solution, crystals are obtained precisely similar to those of salseparine. I mention this fact, to give an idea of the influence exercised by the manner of operating, on the physical properties of this substance.

It is owing to this circumstance that M. M. Thubeuf, Folchi and Batka were led to suppose that they had discovered a

new principle in sarsaparilla.

I will now proceed to the comparative examination of the four substances spoken of above, and I think that I can satis-

factorily prove that they are one and the same principle in somewhat different forms.

They are all white, scentless and tasteless when in an anhydrous state. They have a very austere and nauseous bitter taste, when they are dissolved in alcohol or water. They have a greater specific gravity than this latter fluid. They are insoluble in cold water, but little soluble in boiling water, very soluble in boiling alcohol, but less so in this fluid when cold. Boiling ether readily dissolves them, as do the volatile oils, but the fat oils take up a less quantity. They slightly redden turmeric paper; they have no action on litmus, but change syrup of violets to a green. If they are exposed to the action of heat in a small glass tube, they first become of a yellowish colour, which gradually becomes darker; then are fused, and finally are decomposed, furnishing the usual products of a dry distillation of vegetable substances. The coal left, is extremely light, and is remarkable for its metallic brilliancy. Their aqueous and alcoholic solutions furnish much froth on rapidly stirring or shaking them.

If these substances are mixed with sulphur, they enter into fusion with this body when heated, and are decomposed, giving rise to a disengagement of sulphurous and hydrosulphuric acids; there is also a formation of sulphuric acid. These substances are decomposed by chlorine. Potash aud soda dissolve them when aided by heat. Ammonia also dissolves them; hence, in precipitating them by this alkali, it must not be used in excess.

They all crystallize in small radiated prisms when their alcoholic solution is carefully evaporated. As generally obtained, they are pulverulent.

The substance described by M. Batka is not an acid, as I before observed. It is true, it reddens litmus, but this arises from the presence of a small quantity of hydrochloric acid. It is well known with what tenacity many vegetable substances retain this acid. But, if the pretended acid of M. Batka be washed with water seven or eight times, it loses all its acid properties. Moreover, by dissolving it in sulphuric

acid and precipitating it by ammonia, salseparine is obtained, which may be crystallized.

It is therefore erroneous to bestow four names on the same substance; smilacine, salseparine and parillinic acid, are identical with the parilline of M. Palotta, to whom the credit of the discovery of this substance is due; the others have merely given new processes, of which that of M. Thubeuf is the best.

M. Poggiale then gives the results of a great number of analyses of these substances, showing that the elementary composition of the whole of them is the same, namely, C⁸ H¹⁸ O³ + (H² O.) He adopts the name of salseparine as being the best.

The action of acids on this substance is interesting. The author goes on to say: We are as yet not acquainted with any unazotized body which saturates acids and forms salts with them. Notwithstanding this, I at one time thought that salseparine formed an exception, as very diluted acids dissolve it completely: if this substance be crystallized in an acid fluid, the form of the crystals will differ according to the acid made use of. Hydrochloric acid affords them in silky tufts, sulphuric in small prisms. Potash, soda, ammonia &c. cause an abundant precipitate when added to a concentrated acid solution of salseparine. It might be supposed that in this case the alkali removed the acid which was combined with the salseparine; but there is evidently no chemical combination of these bodies; if the salseparine be precipitated when an alkali is added, it is because this latter combines with the acid, without whose aid the salseparine is not soluble. If the salseparine, treated with sulphuric acid, be washed two or three times with water, the last washings do not redden litmus paper, whilst the salseparine which remains on the filter, on being dissolved in alcohol, is precipitated by barytes water. This character led me to think that the acid was really combined with the sulphuric acid. A closer investigation completely changed my views. If salseparine crystallized from very diluted sulphuric acid, be washed for a long time, it will become obvious that the acid

is not combined, but is merely retained by it. M. Soubeiran who was much interested in these investigations, suggested the following method of proving that salseparine does not combine with acids; he crystallized it in alcohol containing an excess of sulphuric acid, placed the crystals in a tube closed at one end, and covered with cotton; he then poured sulphuric ether on the cotton, this, in traversing the salseparine, carried off all the sulphuric acid with it. This experiment succeeded perfectly.

Sulphuric acid exercises a peculiar action on salseparine. If it be added in a concentrated state to salseparine, drop by drop, this substance becomes of a dark red colour, which gradually changes to a violet, and finally to a pale yellow. A solution is obtained, from which, on the addition of cold water, the salseparine is precipitated, and the yellowish colour disappears. Hence it is evident the salseparine is unaltered by the acid, notwithstanding the change of colour. Cold water does not precipitate it from its solution in diluted sulphuric acid.

The action of nitric acid on this substance, differs from that of sulphuric. When concentrated, it dissolves it at the ordinary temperature, but it alters a small portion of it; this altered part becomes yellow. The nitric solution gives a white precipitate on the addition of water, formed almost entirely of unaltered salseparine.

Hydrochloric acid also dissolves salseparine, and on evaporating the solution affords fine crystals, in fact all the acids act alike in this respect, to a greater or less degree.

Jour. de Pharm.

ART. XIII.—APPLICATION OF TANNIN AS AN ALKALOIMETER. By O. HENRY.

By Alkaloimetry is meant, processes calculated to show in an exact manner, the quantities of alkaloids contained in certain vegetables. This, which in general has only been ac. complished by long and complicated processes, which are attended with many inconveniences, from the tediousness of the operation, and the repeated decompositions and evaporations they require, hence always exposing the operator, particularly when experimenting on a small scale, to a loss of a certain quantity of the product. Having been several times called upon to determine the richness of different parcels of cinchona in alkaloids, I have been forcibly impressed with the difficulties above alluded to, and have made many experiments to ascertain a more expeditious method of obtaining the desired ends. Thus, wishing to proceed as in alkalimetry, I thought of precipitating the quinine and cinchonine by a liquid of known strength, and the quantity of which would be appreciable by the divisions of a graduated measure. Taking advantage, with this view, of the property pointed out by Serullas, possessed by iodic acid of forming insoluble precipitates with almost all the alkaloids dissolved in alcohol, I thought I should obtain my end, by adopting a solution of pure iodic acid, supposing that an alcoholic solution of quinine &c. would require certain proportion of this test to produce its entire precipitation; but this method did not succeed, because on the one hand, if the alkaloid solution was made with alcohol at 32°, a part of the iodic acid was itself precipitated in an uncombined state, and if made with that fluid at 22°, a portion of the organic acid iodate remained in solution.

Since the discovery of the vegetable alkalies and the happy application of many of them in medical practice, their extraction has become a branch of commercial industry. This, which is of French creation, and for a long time peculiar to our laboratories, is now of sufficient importance to require some means by which the value of the raw materials employed can be readily ascertained. I was therefore led to return to the ideas above alluded to, and was endeavouring to make them practically useful, when the excellent memoir on tannin by M. Pelouze made its appearance. In this essay it was stated that tannin formed white precipitates with quinine, cinchonine, morphine, narcotine, strychnine and brucine, and which were almost insoluble in water.

It had been for a long time known that tincture of galls formed a flocculent, white precipitate with different organic substances, especially with the vegetable alkalies. M. Dublanc had also stated that very small quantities of morphine might be detected by this reagent, and my father, in examining the action of red wines on cinchona, had shown that quinine and cinchonine were precipitated by the colouring matter of these wines, which acted on them like tannin; he also very judiciously deduced that in the preparation of cinchona wine, the white or sweet wines were preferable to those which contained much red colouring matter. Berzelius, in the fifth volume of his Treatise on Chemistry, also notices the action of tannin on the vegetable alkalies, and he thinks that certain organic bases might perhaps be isolated, by forming salts of double decomposition, with their insoluble tannates, by means of acetate of lead.

To these facts, I will add, that by means of tannin we can detect very minute proportions of the organic alkalies in a solution, as the tannates which result are very voluminous, of a white colour, and rapidly precipitate themselves.

Taking these observations as a basis, I have endeavoured to use pure tannin as a test of the richness of certain substances in alkaloids, and have more especially applied it to the different kinds of cinchona.

I therefore prepared, with care, a certain quantity of pure tannin, according to the simple and easy process described by M. Pelouze, which I shall briefly notice. It consists in taking a glass adapter, the smaller end of which is to be partly closed by a dossil of cotton, and the larger provided with a good cork; a certain quantity of powdered galls, sufficient to fill about one half of the adapter, is to be introduced

ether, and the remaining space to be filled with sulphuric ether, and the cork closely fitted in, the ether slowly filtrates through the powder and falls into the receiver. This fluid is to be several times passed through the galls; it becomes of a greenish colour; on standing, it deposits a brownish syrupy crust, which collected in a funnel by decantation, washed with sulphuric ether, and again decanted, holds the pure tannin in solution. It suffices to evaporate this etherial liquid in vacuo, or in a water bath, to dryness; in the first place a voluminous, whitish, yellow foliated product is obtained, which is very light and readily pulverizable; in the latter, the product is in the form of a greenish mass, which is soft when hot, and dry and brittle when cold, and readily reducible into a white powder.

Having thus at my command very pure and dry tannin, I commenced by dissolving a certain quantity in a vessel filled with cold water, protecting it from the action of the air. The solution, at first, took place slowly, the fluid then became more viscous, forming a brownish layer, which covered the bottom of the vessel, and was readily mixed with the remainder of the fluid by stirring; the solution was then complete, and after filtration it had a light greenish brown colour.

To ascertain how much pure tannin it contained, I took two equal portions, namely, fifteen grains, and poured into one a solution of tartar emetic, and into the other, neutral acetate of lead; the precipitates were washed and dried. I obtained—

1. Tannate of antimony $Sb^2O^3\overline{T}^3 = 0.69$ gr. 0.68 gr.; 0.685 gr.

2. Tannate of lead $\dot{P}i\overline{T} = 0.82$ gr. 0.84 gr.; 0.84 gr. which gave of pure tannin with the salt of antimony, 0.5576 grains, and with the salt of lead, 0.5398 grains, for one atom of tannate of antimon. contains,

Protox. antimon. \ 1912.90, or 19.18. Tannin \ 8064.59, or 80.12.

One atom of tartrate of lead contains-

Protox. lead (1394.498, or 34.16. Tannin 2688.198, or 65.84.

Fifteen grammes of the solution of tannin being introduced into the graduated measure of Decroizille's alkalimeter. marked 33.07, showing that each division represented 0.0168 grains by the salt of antimony, or for 100 grammes = 220 divisions, 3.71 grains, (this solution is what I shall call the alkaloimetric liquid.) Afterwards having taken one grain of very pure quinine, and one grain of equally pure crystallized cinchonine, well dried, I dissolved them in a certain proportion of distilled water, acidulated with three or four drops of sulphuric acid.

To these limpid solutions, the alkaloimetric liquid was carefully added, carefully noting the number of divisions required to produce precipitation. The tannate which was formed, was white, curdy and almost insoluble in water; when the precipitate was so large as to lead me to suppose that it was almost complete, I saturated the acid in the fluid by means of a few drops of ammonia, and added more of the test, till a precipitate no longer took place. On observing the number of divisions on the scale, and multiplying them by 0.168, I ascertained the quantity of tannin used. With the quinine, the divisions indicated, of pure tannin, 2.5 grains, and with the cinchonine, 2.71 grains, consequently, by calculation, we find that these numbers give for the tannates formed:

Two atoms of tannin and one atom of alkaloid, or

Quinine 1 atom 2142 = per 100 Tannin 2 atoms 5376 71.10. \$ 27.17. Cinchonine 1 atom 2005 = per 100

2 atoms 5376

These salts may be considered as bitannates; they are acid. I shall make a more detailed examination of them, as well as of the neutral tannate of the organic alkalies, but at present shall confine myself to the practical conclusions I have attained, and which I propose as a new method of alkaloimetry.

Test liquor. This is prepared by dissolving ten grammes of very pure powdered tannin in 190 grammes of cold distilled water, and filtering the solution. There ought to be scarcely any residue. This solution contains one-twentieth of pure tannin; it is colourless, or of a very light greenish brown. It should be kept in a well closed bottle, and be prepared but a short time before it is used.

Each division of Decroizville's alkalimeter contains 0.47 grains of the solution, and consequently 0.0235 grains of tannin, which corresponds to 0.0095 of quinine. Hence we have have only to multiply the number of divisions employed by this number, to ascertain the quantity of the alkaloid present. Suppose, for instance, that for a quantity n of cinchona, it requires 100 measures of the test liquor to produce a complete precipitation, it is merely requisite to multiply 100 by 0.0095 grains to have the quantity of quinine contained in the cinchona, or 100 + 0.0095 of quinine in n of bark.

TRIAL OF CINCHONA BY THE TEST LIQUOR.

About ten pounds of the bark to be tried, is to be taken as a sample, which is to be reduced to a fine powder. One pound of this is to be separated and treated three times with boiling alcohol at 32°, acidulated each time with eight grammes of sulphuric acid; the tincture is to be carefully pressed out, and an excess of hydrate of lead added to it, till it becomes colourless. It is then to be filtered, and a small quantity of oxalate of soda or ammonia added to it, to precipitate any lime or lead in solution in the alcohol; the alkaline liquid is then to be saturated with sulphuric acid, added drop by drop, and the whole evaporated. The residue, slightly acidulated, is to be dissolved in pure water and filtered, to separate the chlorophylline or greenish resin, and weighed. A tenth of it then to be treated by the test liquor, as above described, operating with great caution, and carefully filtering towards the close of the operation, adding the solution of tannin as long as there is any precipitate, then examining how many divisions of the alkalimeter are occupied.

If, for example, in acting on a tenth of the solution, from a pound of cinchona, 123 divisions of the alkalimeter are used, they represent 1.2 grain, consequently the pound of bark contains 12 gr. 3 drachms.*

I believe that this property of tannin may also be made use of to ascertain the richness of opium, nux vomica, &c. &c. in alkaloids, and also to isolate certain known or unknown organic bases in analysis.

Jour. de Pharm.

ART. XIV.—ON COBALT BLUE.

By M. GAUDIN.

Montami, in the preparation of his blue, used a solution of arseniate of cobalt in nitric acid, mixed with chloride of sodium. He evaporated this solution almost to dryness, but not carried so far as to drive off all the acid; he obtained in this way a blue, which he exposed to the air, where it attracted moisture, became red, and soluble in water. In a few days he subjected the moist mass to the action of heat, to expel the excess of acid, again exposed it to the air, and repeated these processes, till the substance was no longer susceptible of becoming red, or of tinging water of a rose colour. In this preparation, the arsenic acid attacked the oxide of sodium, as it gradually became separated from the nitromuriatic acid; and the oxide of cobalt thus set free was transformed into cobaltic acid and combined with the soda: to enable it to become fully developed, the substance must be heated to redness after having washed it. The same result is obtained if the black oxide of cobalt be combined with the

^{*} As each division of the graduated measure, represents but a very small portion of quinine, no great error can arise if two or three divisions more are filled; for 0,0037 gr. multiplied by 3 = quinine 0,0219 gr. or in the pound, multiplied by 10 = quinine 0,219 gr.

arseniate of soda, or the arseniate of cobalt with the oxide of sodium.

Whatever may be the plan adopted to make this blue, it attracts moisture and loses its colour, which may be restored however, by subjecting it to the action of heat. A small quantity of iron does not prevent the appearance of a blue colour.

When M. Thenard was experimenting on the blue colour which bears his name, he found that the union of phosphate of cobalt and oxide of potassium or sodium, produced a bright blue. The proof of the change that took place in the base was, that when he used too much alkali, he obtained a black; when he used phosphate of cobalt and alumine, decomposition likewise took place, and the alumine, instead of acting the part of an acid, as had hitherto been supposed, really played the part of a base.

When oxide of cobalt is combined with glass, to obtain smaltz, it often happens that with the same materials, different shades of colour are produced. It is of importance to ascertain the best plan for obtaining them of a uniform tint. The difference is by some attributed to the presence of iron, but this is an error; it is more likely that it arises from the heat being urged beyond the point at which the blue colour manifests itself, when other chemical reactions take place. It should be borne in mind, that the cobaltic acid is developed in greatest intensity under circumstances which must be closely studied by the operator. I believe that when the oxide of cobalt is pure, that the intensity of the heat sometimes drives off a part of the oxygen and reduces a small portion of the base to a metallic state.

Preparation of some blues. Take the precipitate of borate of cobalt, which is formed by pouring a neutral solution of salt of cobalt into one of borate of soda, or vice versa; wash the precipitate slightly and calcine it for a short time. Mix one part of this borate of cobalt with one or two parts of melted phosphate of soda, and heat the mixture to redness in a crucible. The borate of cobalt may be replaced by a phosphate of the same base, which also affords a fine blue. The

The phosphate of soda may be replaced by an arseniate of the same base.

Borate of cobalt may also be prepared as follows; pour an excess of borate of soda into a solution of a salt of cobalt, and add a solution of sub-carbonate of potash or soda as long as there is any precipitation. Wash, filter, and calcine slightly.

Another Blue. Take twelve parts of slightly calcined phosphate of cobalt, twelve parts of melted phosphate of soda, two parts of melted borax, four parts of calcined alumine, and three parts of calcined subcarbonate of soda. Rub the whole well together in a wedgewood mortar, and afterwards heat it to redness in a crucible.

If instead of cobalt, copper be used, I am of opinion that beautiful green colours will be the result.

Jour. de Pharm.

ART. XV.—ON THE PURIFICATION OF GUM RESINS &c.

By E. Mouchong, Jr., of Lyons.

ALTHOUGH the gum resins in general are not now of the same importance as they were during the reign of polypharmacy, still they demand our attention to a certain degree, and hence I have been led to make some remarks on the modes of purifying them.

To decide with any certainty on this subject, I subjected some of those gum resins most generally used to different comparative treatments, with water, vinegar and alcohol.

Although all the gum resins which come to us in impure masses, require to be purified, I confined myself to those which are most frequently subjected to this operation, namely, ammoniac, galbanum and sagapenum, and it should be noticed that a great analogy exists between the relative pro-

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portions of the two principles which constitute almost the whole mass of these concrete juices.

Lemery, Baumé &c. were right in thinking that the action of heat, however regulated, will always cause a volatilization of a portion of the essential oil they contain. Hence this agent should never be had recourse to when the crude gums can be used, and preference should always be given to the formula which requires the least possible quantity of excipient, to avoid the inconvenience resulting from a prolonged evaporation; great attention must also be paid to the regulation of the heat, and above all to the uninterrupted stirring or agitation of the ingredients, as a neglect in this particular will inevitably cause disappointment, as regards the expected results.

In my experiments the proportions of excipients I have employed for 250 grammes of the resin to be purified, are:

When the fragments or tears are separate, or but slightly coherent, as in gum ammoniac:

	Alcohol at 22°,	1000	grammes,
or	White vinegar at 3°,	500	"
or	Water,	375	44

When the fragments are coherent or agglutinated, as galbanum and sagapenum:

Alcohol at 22	0		1000	grammes,
or Acetic acid a	t 3°,		500	44
or Acetic acid a or Water for a 1 Alcohol at 22° fo	st treatmen	t, 500	625.	
Alcohol at 22° fo	ra 2d "	125		

In each operation, I endeavoured as much as possible to give the gum resins their original consistence. Those which were treated with alcohol, were dissolved as is usual, by the assistance of a gentle heat, and in carefully closed vessels. As to the treatments with acetic acid and water, they were limited to a solution of the substance to be purified, in one or other of these fluids, by the aid of moderate heat and continued stirring, and the subsequent separation of the impurities, by straining through a coarse cloth, and finally a concentration of the product.

TREATMENT WITH ALCOHOL.

Sagapenum Soft brown. 230 gr. 40 gr. ish red masses.	Galbanum ma wh	Ammoniac	Names. Gu
Soft brownish red masses.	Tearlike 210 gr. 40 gr. mass, some-what soft.	Tears.	Quality of um Resin.
230 gr.	210 gr.	235 gr.	Quantity obtained.
40 81	40 gr	15 gr	Loss.
6	d o	235 gr. 15 gr. Not so Compact 25 gr. strong. mass, brittle, of a gray approaching to yellow.	Quality of Quantity Loss. pured to un-Appearance Quantity fur Resin. obtained. Loss. purified.
Somewhat 34 gr. Somewhat 34 gr. soft,not com pact, readi- ly pulled a- part, pale part, pale yellow.	Compact 70 gr. mass, of a somewhat yellowish	Compact mass, brit- tle, of a gray approaching to yellow.	Appearance
34 gr.	70 gr.	25 gr.	Quantity of residue
Remains of stalks, &c. and of earthy matter, mixed with some fragments of bassorine.	Remains of stalks and other impurities; of a reddish colour; not completely dissolved.	Almost entirely composed of small, reddish, ovoid flattened seeds, with longitudinal strine; of an aromatic flavour, like those of	Character of Residue.

TRBATMENT WITH VINEGAR.

Names.	Names. Gum Resin obtained. Loss. pared to un. Appearance Quantity purified.	Quantity obtained.	Loss.	Smell com- pared to un- purified.	Appearance &c.	Quantity of residue.	Character of Residue.	esidue.
Ammoníac	Tears.	210 gr.	40 gr.	210 gr. Less strong, Compact, but having brittle, a marked smooth smell of the of a yellow vinegar. colour.	Compact, brittle, smooth of a yellow colour.	25 FF.	Vegetable fragments, and the seeds above de- scribed; noremains of gum resin.	agments, bove de-
Galbanum	Somewhat 172 gr. 78 gr. soft, aggre-gated mass.	172 gr.	78 gr.	idem.	Very compact, smooth somewhat soft mass of a reddish	80 gr.	Reddish, gum resin,not completely dissolved.	resin, not
Sagapenum	Sagapenum Somewhat 200 gr. 50 gr. soft mass.	200 gr.	50 gr	idem	colour. Tenacious mass of a colour re- sembling di-	37 gr.	Earthy impurities, mixed with much vegetable matter, no trace of bassorine.	ties, mix- vegetable of basso-

Names.	Quantity of Quantity Gum Resin. obtained.	Quantity obtained.	Loss.	Smell com- Loss. pared to un- purified.	Appearance Quantity &c. of residue	Quantity of residue	Character of Residue.
Ammonia	Tears.	225 gr. 25 gr.	25 gr.	Not so strong.	Brittle mass of a gray co- lour, verging	27 gr.	Impurities as before mentioned.
Galbanum Tearlike treated by mass, som water alone, what soft.	Galbanum Tearlike treated by mass, somewater alone, what soft.	125 gr.	125 gr	idem.	FEBS.	98 gr.	Resinous mass, of a straw yellow colour, mixed with vegetable fragments.
Galb. treated, 1st with 500 gr. water, and 2d, with 125 gr.	Somewhat soft masses mixed with tears.	224 gr.	26 gr.	idem.	Mass resembling in consistence, &c. white pitch.	49 gr.	Vegetable fragments, only a trace of gum resin.
Sagapenum treated as preceding.	Sagapenum Somewhat 222 gr. treated as soft masses.	222 gr.	28 gr.	idem.	Resembling except in taste and smell, the preceding.	29 gr.	Vegetable fragments, and earthy impurities mixed with one-sixth of bassorine.

With the exception of the gum ammoniac, which retained in a great measure its natural appearance, these gum resins gradually assumed a brownish colour, so that in a month they were very different from what they were immediately after their purification.

From these experiments, it appears to me that some of the earlier authors were right in advising the use of water, and that the best way is to use a sufficient quantity of this fluid alone when the gum resin is in tears; but when it is in masses

that water should first be employed and afterwards the residue left on the cloth subjected to the action of alcohol at 22°. By this method results are obtained quite as satisfactory as if vinegar or alcohol be used, and it has the advantage of being more economical.

But I repeat, no purification should be practised if it can be avoided, as this process is also prejudicial to the gum resin, however carefully it may be conducted.

Jour. de Chim. Med.

ART. XVI-NEW METHOD OF LABELLING GLASS BOTTLES, &c.

By F. BOUDET.

This method of labelling bottles which was at first only used for those containing corrosive liquids, has been so much improved, and is so readily executed at a trifling expense, that many apothecaries have adopted it in their shops.

Convinced that our readers would be desirous of knowing the mode in which it is done, I requested M. Golfier Besseyre, who is perfectly acquainted with all the details, to communicate them to me, which he has done as follows:

White enamel is to be pulverized, carefully triturated and the finest portions separated by means of water, the residue again triturated, till the whole is reduced into an impalpable powder, which is to be dried. This powder is to be ground with a small quantity of essence of lavender, and may be then used to paint on such glass as will not change its form, when exposed to the degree of heat required to melt the enamel; but for labelling bottles, it is necessary that the enamel should be mixed with one-fifth, one-quarter, or even one-third of the following flux:

Powdered rock crystal, 1 part,
Red lead, 3 parts,
Calcined borax, ½ part.

These substances are to be mixed with the enamel, the whole melted and rubbed down with a certain quantity of essence of lavender and essence of turpentine, which have become thick by long exposure to the air; the proportions generally used are two-thirds of the former to one-third of the latter. This composition is to be applied by means of flat camels' hair brushes. For example; to a portion of the prepared enamel of the size of a hazel-nut, is to be added one drop of the turpentine and two drops of the lavender, and the whole well mixed on a glass pallet; with this mixture a portion of the surface of the bottle, rather larger than the intended label, is to be covered. When it is almost dry, the surface is to be smoothed by a short, thick, but very soft camel's hair brush; when it is perfectly dry, it may be readily ascertained if the proper proportions have been used; too much turpentine renders it difficult to remove the enamel where the letters are intended to be, while too much lavender renders it so soft, that the least touch detaches it.

To write or design on this enamel, all that is requisite is to remove this substance from the spots the letters occupy, which is readily done by a quill cut like a pen but without a slit, the letters or design may be formed by the hand alone, or with the aid of a stencil plate.

The fusion of the enamel, is the last but the most difficult part of the operation. However, with a little practice, a person will always succeed in fusing it by means of an enamelling lamp; when a number of articles are to be thus labelled, a furnace must be used, and the pieces placed in muffles. After the temperature has been raised to the requisite height, that is to a red heat, the fire is to be extinguished, and the furnace closed, so as to anneal the articles properly.

Journ. de Pharm.

ART. XVII.—ON THE EXISTENCE OF THE BI-MALATE OF LIME IN THE BERRIES OF THE SUMACH; AND THE MODE OF PRO. CURING IT FROM THEM IN THE CRYSTALLINE FORM.

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By WILLIAM B. Rogers, Prof. of Chemistry and Natural Philosophy in Wil. liam and Mary College.

THE berries of the RHUS glabrum and RHUS copallinum, the two species of sumach common in Virginia, have long been remarked for their acidity and are still used in some places as a substitute for lemons in different forms of beverage as well as for various other purposes in domestic economy and medicine. In some experiments made more than two years ago upon the acid liquor obtained by macerating the berries in warm water, I have found it to contain a large quantity of an acid salt of lime which I have since determined to be the bi-malate. At the same time too a microscopic examination of the berries of the R. glabrum enabled me to discover the pure crystals of this salt on the outside of the berries mingled with the down. To observe the form of the crystal distinctly, the berries should be slightly moistened and then allowed to dry. The crystals may then be readily seen by the naked eye, and when viewed through the microscope they appear as beautiful hexagonal prisms of the most perfect symmetry.

The existence of this salt in the berries of the Rhus is a fact which appears to have hitherto escaped attention. The only experiments relating to the acid of these plants which I have met with, are those of Mr. I. Cozzens of New York, published in the first volume of the Annals of the Lyceum of that city; and that chemist seems to have regarded the infusion of the berries of the Rhus glabrum as containing malic acid uncombined with any base but "merely contaminated with a small portion of gallic acid which probably proceeds from the pulp of the berries." In his paper on the subject he does not mention having tested the acid liquor for lime, which he would have discovered at once either by evaporating a

few drops in a platinum capsule and then igniting, or by adding to the liquor a little oxalate of ammonia.

So abundant is the bi-malate of lime in the infusion of the berries both of the R. glabrum and copallinum that when reduced by evaporation the whole liquid has the appearance of a thick light varnish and is almost insoluble in alcohol, two characteristic properties of the bi-malate. The process of Mr. Cozzens for preparing a pure malic acid from these berries is therefore liable to the objection that by using alcohol as the solvent, the operator will lose all the malic acid which exists in the bi-malate, and this I am inclined to think is nearly all the malic acid of the infusion. From the very small portion of acid matter which alcohol imbibes by standing for some time over the inspissated infusion, it is obvious that little uncombined malic acid can be present. In fact, nearly all the acid kind in the Rhus exists as a bi-malate in combination with lime. In procuring malic acid from the juice of the Sorbus in which it exists in an uncombined state, the alcohol acts as a solvent of the acid, and is therefore employed with advantage to separate it from mucilage and the other substances with which it is mingled. But it is entirely inadmissible when the acid is to be procured from the bi-malate of lime.

The Bi-malate of Lime is readily procured from the berries in considerable quantity and perfectly pure by the following process:

A quantity of hot rain water or distilled water is poured over the berries in a clean earthen or wooden vessel. After allowing the berries to macerate for a day or two, the liquid is poured off and evaporated carefully in an earthen or porcelain dish until it becomes intensely acid. It is now filtered through animal charcoal or bone black, repeatedly washed with muriatic acid. The liquid passes through almost colourless having only a slight amber tint. If the evaporation has been carried sufficiently far, a large deposit of crystals will form in a few hours. The liquid being poured off and further reduced by evaporation an additional crop of crys-

tals may be obtained and is this way nearly all the bi-malate may be separated. The salt thus procured will often be slightly tinged with colouring matter, in which case it should be re-dissolved in hot water and crystallized anew. It is

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then perfectly pure.

When the crystallization of the bi-malate has been rapid the mass presents the pure and shining white of the sulphate of quinine. When more slowly conducted, hexagonal prisms of the most beautiful proportions are obtained. The largest of these have generally two of their parallel faces much broader than the rest, so that when placed upon any smooth surface they have the appearance of rectangles, slightly bevelled at the edges. In the salt suddenly crystallized, the crystals are much more slender, and are perfectly regular hexagonal prisms with bevelled extremities. They are frequently in pairs crossing at right angles, and in groups formed of several of these pairs. The variety of proportions among the different crystals and the exact symmetry which each presents are matters of very pleasing observation through the microscope. The great facility with which this salt crystallizes from the infusion of the berries, led me at first to doubt whether the acid contained in it was really the malic, for it would appear from the remarks of Berzelius and Thompson on the bi-malate, that hitherto it had not been procured in the crystalline form from the juices or infusions of plants. The former chemist in the fourth volume of the Traité de Chimie, speaking of this salt under the title of Sur-malate Calcique observes, "Il resemble à la gomme par son aspect;" and again, "Ce qui vient d'être dit ne se rapporte qu'au sel tireé des plantes; d'après Braconnot celui qu'on prépare à l'aide de l'acide, cristallise en prismes hexagones." Dr. Thomson does not speak of it as crystalline, and states that "when the supermalate of lime is evaporated to dryness it assumes exactly the appearance of gum arabic."

A very careful examination of the crystalline salt shows it to be a true bimalate, and I am therefore disposed to think that the uncrystallizable character of the bimalate procured from the Sorbus, Sempervivum &c. arises from the admixture of mucilage and other impurities.

The salt procured as above is intensely but agreeably acid. It dissolves abundantly in water, but in very small proportion in alcohol. At a low heat it fuses and parts with its water of crystallization, assuming at the same time a gummy aspect. A little below redness the acid is decomposed, the mass swells very much, and if the heat be increased, every thing is driven off but the lime which remains in a bulky form, but perfectly pure and white. A single crystal placed on a slip of platinum foil and held over a spirit lamp, presents a very curious appearance, first melting, and in a moment after shooting up in a white column of pure lime. This phenomenon is quite characteristic of the salt.

In investigating the nature of this salt, of which as already stated, I at first entertained some doubts, I made the following experiments:

1. A portion of the salt was heated to bright redness in a platinum capsule, so as to drive off all the water and acid. The white spongy mass remaining was strongly alkaline. It was dissolved in dilute muriatic acid. The solution was divided into two portions, of which one was tested for potash, the other for lime. None of the former base could be detected, but an abundant precipitate of oxalate of lime indicated the presence of the latter.

2. A portion of the salt was dissolved in distilled water in a test tube. Upon adding a few drops of liquid oxalic or citric acids, a white precipitate was formed. Liquid tartaric acid being added to a similar solution produced, after some time, brilliant octahedral crystals of tartrate of lime, which adhered to the sides of the tube. It appeared therefore, that the base of the salt was lime.

3. To a solution of the salt in distilled water, a few drops of the solution of acetate of lead were added. A beautifully white flocculent precipitate was abundantly produced. This precipitate was insoluble in ammonia, and therefore could not be a citrate of lead. Indeed, neither citric, tartaric, or

oxalic acid could be suspected in the salt, inasmuch as neither of these acids are known to form acid salts with lime.

4. The precipitate procured by the acetate of lead was well washed with distilled water, and then heated in the same, to the boiling point. It almost entirely disappeared. But upon allowing the liquid to cool, the salt of lead separated and formed upon the surface and around the edges of the liquid, groups of the most brilliant satin like crystals. The crystals in these groups were extremely slender, diverging from the common centre of the group with the most perfect regularity. Solubility in hot, and insolubility in cold water are characteristic of the malate of lead. But the novel and very peculiar crystallization just described made me hesitate at first in pronouncing this precipitate a malate. Berzelius describes it as collecting "Sous la forme d'écailles blanches ayant l'éclat de l'argent." Afterwards however meeting with Wöhler's process for obtaining malic acid, I found that pure malate of lead crystallizes as I have described. It is not necessary for the production of this peculiar form of crystallization, that the precipitate should be washed and re-dissolved, for I have since found that the usual flocculent precipitate if heated in the supernatant liquid, and then left for some time undisturbed, is transformed into an assemblage of radiating groups such as have been described.

5. Ten grains of the salt obtained from the berries were exposed to a white heat, in a platinum capsule, until the water and acid were entirely expelled. The lime remaining weighed 1.25 grains. This result accords very closely with the composition of bi-malate, as determined by Braconnot.* According to that chemist, as quoted by Thomson, the constituents of the bi-malate are

2	atoms	malic acid,		17.00
1	46	lime,		3.50
0	"	water,	,	6.75
				97 95

This would give in 10 grains of the salt 1.28, differing by three hundredths of a grain from my determination.

6. With the view of repeating some of the experiments of Lassaigne upon the acids produced by the destructive distillation of malic acid, I introduced several grains of the bimalate into a glass tube, about one third of an inch in diameter and ten inches long. One end of the tube being hermetically closed and the salt all collected in that extremity, the tube was bent at two points, in a zigzag form. The closed end was then held in the flame of a spirit lamp, to expel and decompose the acid. In the angle of the tube remote from the flame, an acid liquid mingled with empyreumatic tar collected, and near the flame adjacent to the salt, needle formed crystals of an amber colour collected on the surface of the tube. The liquid being removed from the tube was evaporated gently, and then suffered to cool. Numerous scaly crystals formed, resembling the flat figures which snow sometimes assumes. These crystals were intensely acid, and soluble in alcohol and in water. Heated in a test tube, they were partially decomposed, and needle shaped crystals sublimed, resembling those deposited near the closed end of the tube in the first operation. Thrown upon burning charcoal, they exhaled a white smoke, of a suffocating odor. A solution of this pyromalic acid in water, added to a solution of lead, produced a precipitate, at first flocculent, but afterwards becoming gelatinous. The sublimate was much less soluble than the acid just described. These substances agreed in properties with the pyromalic acids described by Lassaigne, and thus another proof was furnished of the true nature of the acid existing in the salt of the sumach. As but a small quantity of the sublimate was procured, I was prevented from examining its properties extensively. Little is yet known concerning it and I am at present preparing to give it a more complete examination.

The attention of the French and German chemists having lately been much directed to the constitution of the vegetable acids, various improved methods of obtaining the malic acid in a pure form, have been devised and published. In all

these however, the acid is extracted either from the Sorbus or Sempervivum. As in the former of these plants it exists almost entirely uncombined, while in the latter it is united with lime as a malate, a separate process is necessary for each. In procuring the acid from the Sempervivum the malate is converted into a bi-malate by the addition of so much sulphuric acid as will remove one half the lime, and then other operations upon the crystallized bi-malate, are necessary to separate the malic acid. From the comparative ease with which the bi-malate may be obtained from the berries of the Rhus, and the purity of the salt when procured in this way, there is no doubt that this fruit may be very advantageously employed in preparing malic acid for chemical purposes. I have as yet made no experiments to ascertain the amount of bi-malate which a given weight of the ripe berries of each of our species of Rhus will furnish, but I have no doubt that it would be found very considerable. Of the medicinal properties of the salt, I believe little or nothing is known. Should it have any value in this respect, or should its pleasant acidity bring it into general favour as an ingredient in our summer beverage, the great abundance of the plants in which it exists, would no doubt make it an object extensive manufacture. Amer. Jour.Sci. and Arts.

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ART. XVIII.—ON PECTIC ACID AND THE PECTATES.

By M. SIMONIN.

HITHERTO the use of pectic acid and the pectates, in the extemporaneous preparation of jellies, &c. has not been as general as it ought to be; this may have arisen from the difficulty of preparing them; in fact the operation is tedious, intricate, and often attended with failure, especially with persons not accustomed to the manipulations requisite for success. The intention of the following remarks is to simplify the process by the employment of means hitherto considered as inadequate.

I have employed the following method for several years, profiting by the observations of M. Braconnot on the conversion of pectine into pectic acid by the fixed alkalies.

The pectine, or abundant jelly which forms in currant juice, after the juice of sour cherries has been mixed with it, is to be separated from the fluid, and washed, to get rid of as much as possible of the colouring matter; it is then to be boiled with a very weak solution of caustic potash; afterwards, to separate any fragments of the fruit that may be present, it is to be filtered through a coarse cloth. This pectate is to be decomposed by gradually adding and stirring a sufficient quantity of liquid chloride of lime; the fluid rapidly loses its colour, and there is a formation of pectate of lime, in whitish flakes; this is to be collected on a cloth, and then mixed with water slightly acidulated with hydrochloric acid, which decomposes the pectate and dissolves the lime. The pectic acid is now to be drained on a cloth, and well washed with distilled or rain water, to dissolve any excess of the hydrochlorate of lime or of acid which may be present, it is then to be subjected to a slight pressure to separate the water.

In this state the pectic acid is almost colourless and transparent, in the form of a compact jelly; it combines with the alkalies with great facility, a few drops of ammonia being sufficient to liquify it, giving it at the same time a brown colour. If it is wished to prepare the pectate of ammonia, a

sufficient quantity of this alkali is added to give it the consistence of a syrup, which is to be filtered, and exposed in thin layers in porcelain plates to the heat of the sun or a stove; it soon dries, and separates from the plate, in brown, transparent, vitreous scales; this pectate is completely soluble in distilled water, from which alcohol and sugar will separate the pectic acid in the form of a jelly.

If, instead of ammonia, caustic potash or soda be employed, there will be a formation of pectates of these bases.

It is of the utmost importance to use water for the washings which contains neither lime nor calcareous salts, as a very small quantity of these will cause the formation of pectate of lime, and hence a failure of the operation.

From two hundred pounds of red currants, I obtained near eight ounces of pectate of ammonia, which would give a gelatinous consistence to five hundred times its weight of water.

When a large quantity of pectic acid is to be made, there might be some difficulty in procuring a sufficiency of distilled, or rain water; I have in such case successfully used river and well water, deprived of its calcareous salts by means of a little potash, but care must be taken not to render it alkaline, or it will dissolve the pectic acid and thus diminish the product.

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ART. XIX.—EXTRACTS FROM THE JOURNAL DE CHIMIE MEDICALE.

Translated for the American Journal of Pharmacy, by Augustine Dumahel.

THE subjoined memoir of Dumas and Peligot is one possessed of the highest interest, from the advantage conferred upon chemistry, by the important discoveries made by them of three new gases. These resulted from the labours of the indefatigable authors upon a substance known by the names of Pyroligneous spirit, Pyroxalic spirit, Pyroligneous ether, Pyroxalic ether and spirit of wood. They have discovered in this substance the characters of a true alcohol isomorphous with common alcohol.

Pyroligneous spirit, as well as the many other products formed in the distillation of wood, have occupied the attention of chemists for a number of years past; but it is only of late that their experiments have been rewarded by the most signal discoveries. Berzelius, speaking of pyroligneous spirit, says, "Ph. Taylor was the first to remark its existence, and who noticed it to consist of a particular liquor analogous to alcohol, but not identical with it; Colin confounded it with pyroacetic spirit; and Macaire and F. Marcet, finally described the properties and composition of this body."

It would appear from the incongruity in descriptions and want of similitude in their experimental results, that there was great confusion among writers upon this subject. Berzelius making mention of this says, "The contradictions which these present, given upon experiments so simple, appear to indicate the existence of several kinds of pyroligneous spirits, which have some analogy under certain relations, but different the one from the other, in some of their properties." After stating the manner in which it is obtained, and giving some of its physical characters, together with the action of the acids upon it, Berzelius concludes thus:

"In the actual state of our knowledge, it is not easy to say what is the true nature of pyroligneous spirit. The hypothesis of its being an impure alcohol, is not exact.

It is much more probable that it consists of a species of ether of which we do not know the acid."

The uncertainty which hung over this substance, from the want of knowledge as to its exact atomic composition, is now happily cleared away by the following memoir.

TRANSLATOR.

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MEMOIR.

Upon a new Alcohol, and upon the etherial products which proceed from it.

Read at the Royal Academy of Sciences, Nov. 3d, 1834, by Dumas & Pell.

GOT.

Spirit of wood exists in solution in the aqueous part of the products of the distillation of wood. This last being decanted in order to separate it from the undissolved tar, it is submitted finally to distillation in manufactories, to extract from it, at least in part, the tar which it held in solution. It is in the first products of this distillation that you must seek the spirit of wood.

Collect, then, the first ten quarts proceeding from each hundred quarts of liquid subjected to distillation, and submit this impure product to repeated rectifications, in the manner you would concentrate alcohol. As the boiling point of spirit of wood is very low, these rectifications may be made in a water bath, and you can in this way deprive it of nearly all foreign substances.

Pure spirit of wood is a very fluid, colourless liquid, having a peculiar odour, which is at the same time alcoholic, aromatic, and resembling that of acetic ether; it burns with a flame similar to that of common alcohol; it boils at 66° C. under the pressure of 0.701. Its specific gravity 0.798 at the temperature of 20° C.; that of its vapour is 1.120. Its composition is represented by C4H4,H4O3.

Thus each volume of spirit of wood comprehends one volume of carbon, two of hydrogen, and one-half of oxygen.

METHYLENE.

It is thus Messrs. Dumas and Peligot name carburetted

hydrogen C⁴H⁴, which forms the radical of all the combinations of which we are about to speak. So, according to them, spirit of wood is a bihidrate of methylene, consisting of one volume of vapour of water, and one volume of methylene, condensed into one volume.

Spirit of wood, exposed to the contact of air and black platinum is converted into formic acid, whilst common alcohol, submitted to the same action gives acetic acid. The acids exert a special action upon spirit of wood; it is, however, worthy of remark, that the action of the oxygenated acids, such as nitric acid, is much weaker than that which the acids exert upon alcohol.

When a solution of potash, in spirit of wood, is put in contact with sulphuret of carbon, it forms a product analogous to that which M. Zeise described under the name of hydro-zanthate de potasse. Spirit of wood dissolves the resins perfectly, and as it is more volatile than alcohol, it is very convenient for making varnish.

HYDRATE OF METHYLENE.

Thus the authors name the gas obtained in distilling a mixture of one part of spirit of wood and four parts of concentrated sulphuric acid. This gas is to spirit of wood what common sulphuric ether is to alcohol; that is to say that the bihydrate of methylene, (spirit of wood,) has lost half of its water to form ordinary ether. This gas presents indeed to the eudiometric analysis the following composition, C*H*H*O.

Hydrate of methylene is a colourless gas, has an etherial odour, and burns with a pale flame. Water at 18° C. dissolves thirty-seven times its volume. When the bihydrate of methylene is made to act on the hydracids, new compounds are obtained, perfectly analogous to hydrochloric, hydriodic, and other ethers of alcohol. In these compounds there always enters a volume of acid for a volume of methylene.

HYDROCHLORATE OF METHYLENE.

This is easily obtained by heating a mixture of two parts of sea-salt, one of spirit of wood, and three of concentrated

sulphuric acid. With the assistance of a slight heat, a gas is obtained which may be collected under water, and which is

the pure hydrochlorate of methylene.

This gas has an etherial odour; burns with a fine green flame; water dissolves of it 2.8 of its volume at 16 C.; its formula is represented by C⁴H⁴H²CH². It is decomposed in passing through a porcelain tube, heated to redness, producing hydrochloric acid and a carburetted gas, which is methylene that has not been obtained pure by this process.

HYDRIODATE OF METHYLENE.

This is prepared by distilling one part of iodine, eight of phosphorus and 12 of spirit of wood. It is in the form of a colourless liquid, the specific gravity of which at 22° C. is 2.237; it boils at 50°. According to the analysis that they have made, it is represented by C4H4I3H3.

Action of the Acids upon Spirit of Wood. SULPHATE OF METHYLENE.

If one part of spirit of wood, and eight or ten of sulphuric acid at 66°, be distilled together, an oily liquid more dense than water is obtained. This ether properly rectified, is colourless, having an alliaceous odour, a specific gravity at 22° of 1.324; it boils at 188°. Its formula is H²O,C⁴H⁴O. S

It is a true neutral sulphate of methylene, with an atom of water. With the acid of this compound, all the combinations of methylene may be produced; with cyanuret of potash it gives sulphate of potash and hydrochlorate of mythelene, or hydrocyanic ether.

NITRATE OF METHYLENE.

This is obtained in distilling together one part of nitrate of potash in powder, one part of spirit of wood, and two of sulphuric acid. Distil the product obtained in a water bath. Thus you have a colourless liquid, of the specific gravity 1.182, which burns readily with a yellow flame; heated in a tube, it detonates with violence. M. M. Dumas and Peligot were hurt by the result of this detonation.

Its formula is H²OC⁴H⁴A²O⁵; heated with potash, spirit of wood, and nitrate of potash are obtained.

OXALATE OF METHYLENE.

Distil a mixture of equal parts of sulphuric and oxalic acids and spirit of wood, a liquid passes, which, exposed for some time to the air deposits voluminous crystals which are oxalate of methylene. This ether melts towards 51°, and distils at 161°. It crystallizes perfectly in rhomboidal plates of great brilliancy. Its formula is H²O,C⁴H⁴C⁴O³; that is to say, one atom of oxalic acid, one atom of methylene, and one of water.

ACETATE OF METHYLENE.

This is obtained by the distillation of two parts of spirit of wood and one of crystallizable acetic acid. It is a colour-less liquid, of an agreeable odor, boiling at 55° C.; its specific gravity is 0.919; its formula H²O, C⁴H⁴C⁸, H⁸O³.

SULPHO-METHYLATE OF BARYTA.

This is obtained by the same process as the sulpho-vinate of baryta, a salt with which it corresponds. It crystallizes in quadrangular plates, colourless and unalterable in the air. Its formula is C⁴H⁴, H²OSO³+H⁴O². In treating the aqueous solution of this salt by a sufficient quantity of sulphuric acid to carry off the baryta, filtering and evaporating in vacuum, the bisulphate of methylene is obtained, which corresponds to the sulpo-vinic acid of alcohol; it crystallizes very well. The results of all these experiments of M. M. Dumas & Peligot, present the following facts:

- 1. Spirit of wood corresponds to alcohol.
- 2. In losing half of its water, it forms a gaseous ether.
- 3. Its radical unites volume to volume, with the hydracids, to form neutral anhydrous ethers.
- 4. It unites atom to atom with the oxacids to form salts, always hydrated.
- 5. It forms with phosphoric and sulphuric acids, bisalts, which dissolve the mineral bases to form double salts.
 - 6. Finally chemistry is enriched with three new gases by

this labour-methylene, hydrate and hydrochlorate of methylene.

The history of methylene presents likewise very remarkable cases of isomerie,* thus:

Hydrate of methylene is isometric with alcohol;

Carbonate of methylene with citric acid;

Formiate of methylene with acetic acid; and the citrate with sugar.

The authors propose to continue their researches upon this interesting subject.

ART. XX-POISONING BY MORRISON'S PILLS.

One Webb, proprietor of a tavern named the London Coffee house, was lately tried at the assizes of the city of York, accused of the crime of poisoning. Here are the facts. A young man employed at Webb's, having been attacked with the small pox, the latter, instead of calling a physician, administered to him Morrison's pills. This treatment commenced upon the 17th June; on the 20th Richardson was dead.

An inquest taking place, examination was made, and the intestinal tube was discovered to have been the seat of a serious inflammation, which was attributed by the physicians, not to the disease, but to the nature of the treatment used. M. W. West, was entrusted with the making of the analysis of the pills; he found them composed of cream of tartar, gamboge, tincture of aloes, and a small quantity of rhubarb; and several physicians, M. M. Allan, Mathiesson, Belcomb, and Walker, affirmed that in the state in which the patient was, they accelerated his death. The inventor being interrogated upon the nature of his processes, revealed the secret of his

^{*} Not being able, in translating the above, to give the corresponding English term, I have taken the liberty to supply its place by that of the French. Isomerie is derived from two Greek words, 1505, equal, and \$\mu \text{epis. part}\$

preparation, and granted that in the case of small pox, his pills administered in strong doses, might cause death. The pills had been given to Richardson in the dose of ten, fifteen, and even twenty. The cause having been heard—Webb was declared guilty by the jury, and although it was shown that he had no interest in poisoning Richardson, he was condemned to death. It is hoped that the sentence will be commuted; the members of the court uniting to petition his majesty.

Journ. Chim. Medicale, for Dec. 1834.

XXI.—DETECTION OF ARSENIC WHEN MIXED WITH ORGANIC SUBSTANCES. By M. TAUFFLIER.

The operations of legal chemistry are often directed to the detection of arsenic in organic substances; for instance, in the matters found in the digestive canal of persons supposed to have been poisoned. In this case it is essential, before having recourse to reagents, to destroy the organic substances mixed with the supposed poison. The various plans hitherto devised for this purpose, have been, to decompose these organic matters by fire, by acids, or by alkalies. These modes have given satisfactory results, but they present many difficulties.

I have succeeded in getting rid of these substances, by a simple method, which enables the operator to detect very small proportions of arsenious acid. The mucilaginous fluids, arising from a decoction of the contents of the stomach, are to be treated by a solution of oxide of zinc in potash; this oxide combines with the organic matters, and forms an insoluble compound, which rapidly precipitates. The supernatant fluid is clear and limpid, and may be filtered or decanted; it contains arsenite of potash and an excess of oxide of zinc dissolved in potash. This liquid being acidified with hydrochloric acid, hydrosulphuric acid is to be added, when a yellow colour will be developed, if there is the least trace of

arsenious acid present. The zinc remains in solution. By boiling, the sulphuret of arsenic collects in yellow flakes, which, having been collected and washed, are to be heated by the means proper to reduce it to a metallic state. By this method one-tenth of a grain of arsenious acid may be detected in half a pound of alimentary matters.*

To reduce the sulphuret of arsenic, I make use of a very simple process, which will give evidence of arsenic in the most minute portion of the sulphuret. This consists of introducing the sulphuret into a glass tube of three inches in length, and closed at one of its extremities, and placing directly above the sulphuret a piece of leaf silver rolled into a ball. The closed extremity of the tube is to be heated by means of a spirit lamp. A decomposition immediately takes place, the sulphuret is volatilized and decomposed, the sulphur entering into combination with the silver, whilst the arsenic condenses in a metallic state in the form of a brilliant blackish gray ring, a little above the heated portion of the tube.

If instead of reducing the sulphuret to a metallic state, it is wished to transform it into arsenious acid, instead of the leaf silver, the oxide of that metal is to be used. The decomposition takes place very rapidly at a somewhat elevated temperature, the arsenious acid which is produced condenses towards the upper part of the tube, in small, white, octahædral crystals, which may be readily detached. If the acid be in so small a quantity that it would be impossible to detach it, by reversing the tube, the sulphuret of silver, which has melted into a small solid mass, will fall out. Distilled water is then to be poured into the tube, and on the application of heat, the arsenious acid will be dissolved, when the solution can be tested by the proper reagents.

Journ, de Pharm.

^{*} The operation also succeeds by using a solution of sulphate of zinc, and then adding potash or subcarbonate of soda in excess, instead of making use of the solution of oxide of zinc.

ART. XXII—ON THE USE OF INSOLUBLE SALTS AS A MEANS OF SEPARATION IN CHEMICAL ANALYSIS.

By Horace Demarcay.

[Extract.]

A class of metallic oxides is characterized by its not fully saturating acids, and of only being soluble in an excess of these agents. To this class belong the oxides of iron, chrome, tin, bismuth, antimony, as well as the oxides of the electronegative metals. Except when there is a powerful play of affinities, it is possible to precipitate these oxides. In fact, the carbonates of lime, barytes, strontian, or magnesia, mixed with a cold solution of oxide of iron, separate this metal so completely that the most sensible tests indicate no trace of it. Oxide of iron may thus be separated from the oxidule of the same metal, from the oxides of manganese, cobalt and nickel, with greater ease and certainty than by any other method. The carbonates of barytes and strontian should be preferred from the ease with which they can be separated from the fluid, in which they are partly dissolved, or from the oxide of iron precipitated with them. This plan is the best to obtain the oxide of cerium, entirely free from iron.

The oxide of bismuth acts like the oxide of iron. Carbonate of barytes separates it from copper. In the same way it may be separated from lead, manganese and nickel. The carbonate of barytes likewise precipitates the oxides of anti-timony and tin from their solution in hydrochloric acid, and may serve to separate them from lead and copper, to which they are united in a variety of alloys.

The oxidule of tin is not separated like the oxide from its solution by the carbonate of barytes. This may be taken advantage of to separate tin from antimony. The oxide of chrome acts like the oxide of iron with carbonate of barytes. Hence this metal may be separated from the oxides of nickel, of cobalt, of manganese and those spoken of when noticing the oxide of iron. If the solution contains iron, it will be

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precipitated with the oxide of chrome, and may be separated from it afterwards by calcining them with potash. To separate iron from chrome when they are both in solution in an acid, all that is required is to saturate the fluid with hydrosulphuric acid, to bring the iron to the state of a deutoxide, when the oxide of chrome alone will be precipitated by the carbonate of barytes.

The oxide and oxidule of mercury dissolved in nitric acid, are precipitated like the oxide of bismuth by carbonate of barytes. This means may be employed to separate this metal from those which, like it, are precipitated by hydrosul-

phuric acid.

It has heretofore been proposed to separate the different oxides by means of the carbonates of the alkaline earths, without this idea having received the attention it deserved; but the reason why this method obtained so little favour, is that the important point of the temperature at the time of precipitation had not been adverted to. The action of these salts differs with different temperatures; thus the chlorides or nitrates of cobalt, nickel, manganese, zinc and copper are completely decomposed by the carbonates of lime, barytes and magnesia, but only at a temperature above 60°. Copper and zinc are the first precipitated, cobalt and nickel next, and manganese the last; but this circumstance cannot be taken advantage of to separate these metals from each other.

Journ. de Pharm.

MINUTES

OF THE

Philadelphia College of Pharmacy.

Sept. 30, 1834. The Society went into an election for Trustees in place of those whose term of service was about to expire, and the tellers reported that the following were duly elected:

C. E. Pleasants, F. R. Smith, Jos. Scattergood, Jos. C. Turnpenny, Jacob Bigonet, P. Lehman, W. Hodgen, Jr. and S. F. Troth.

The resignation of Edward Townsend was received and read.

F. R. Smith presented a specimen of oil of camphor from India, which was ordered to be placed in the collection of the College.

Oct. 28. The committee on Latin labels made a report, when after discussion, the subject was referred back to them with power to act.

The committee on Patent Medicines was discharged and a new committee appointed, with instructions to inquire into the expediency of having new directions for patent medicines prepared, expunging such parts of the old English directions now in use, as may be exceptionable.

Nov. 25. The Board of Trustees reported the election of Thomas J. Husband and Stephen Proctor as resident members.

The committee on Latin labels made a report recommending the same, and stating that T. K. Collins & Co. have undertaken to print and publish them on their own account; to be executed with great neatness on coloured paper, there being three distinct sizes of labels, and not less than 1000 in each book. The committee also recommend the passage of the following resolution:

That the book of Latin labels about to be published by T. K. Collins & Co., being in accordance with the nomenclature of the revised edition of the U.S. Pharmacopæia of 1830, published in Philadelphia, and with other standard authorities, be recommended to the Druggists, Apothecaries and Physicians of the United States as correct.

A communication on the Fluid extract of Senna by Charles Ellis, was read and referred to the Publication Committee.

Dec. 30. The Board of Trustees reported the election of John Bringhurst as a resident member.

Dr. F. Bache, Dr. G. B. Wood and W. Hodgson Jr., were added to the committee on Latin labels, to assist in their revision and insure their correctness.

An improved minim measure was presented to the College by Robert Alsop of London, a foreign associate member, through W. Hodgson Jr. This measure, the invention of the donor, is a cylindrical tube five or six inches in length, and about one-fourth of an inch in diameter, tapering toward the lower end to a fine point. It is accurately graduated from one minim up, and fitted inside with a piston, by the elevation of which a certain quantity of air is displaced, and any number of minims of the fluid may be accurately measured, at the same time that a volume of air, intervening between the piston and the fluid, prevents any contact of the two.

Dr. F. Bache read an extract of a letter from Dr. Turner of London, in which he stated that a prospect existed of the speedy adoption of a National Pharmacopæia in Great Britain and Ireland, to replace the three, of London, Edinburg, and Dublin, now in use.

Jan. 27, 1835. The resignation of W. Hodgson Jr. as a trustee was read and accepted, and an election held to supply the vacancy thus occasioned, when Charles Schæffer Jr. was duly chosen.

Feb. 24. The committee on Latin labels reported progress and were continued, and Warder Morris added to said committee.

March 31. The Board of Trustees reported that the degree of Graduate in Pharmacy had been conferred on the following candidates, they having complied with the requisitions of the College:—Isaac J. Martin, Richard Price, Ambrose Smith, William R. Kitchen, Charles S. Shreeve, C. J. Lee, Jonathan Evans Jr., James Hopkins, A. Olmstead and James Cockburn Jr.

The committee on Latin labels reported progress and are continued.

The Publication Committee made a report, which, after detailing their financial operations, went on to say:

Since the commencement of this publication, it will be perceived by a reference to the annual reports, that the number of subscribers has been much smaller than could have been expected, and the amount of money received has been barely sufficient to meet the necessary expenses. It must also be obvious, that with very few exceptions the original papers

have been furnished by individuals resident in Philadelphia, so that notwithstanding this is the only Journal in the United States exclusively devoted to pharmaceutic and chemical researches, such has been the apathy or unwillingness of members of our profession in other cities to contribute to its pages, that your committee are obliged to rely almost entirely on home materials.

This state of things, in the opinion of your committee, has in a great measure arisen from the following causes: The title of the publication is local, thus preventing many from contributing to its pages, and making it the record of their observations and experience, from a belief that they were reserved solely for members of the College. That this is the case is corroborated by the fact that with very few exceptions, no original paper has been obtained from foreign sources, or from individuals not members of the College, except at the personal solicitation of the committee. In support of the view your committee have taken of the subject, they would cite the example of the Journal de Pharmacie; this well known publication was originally placed in the same circumstances as our own Journal, being for some years, from 1809 to 1815, published under the title of the Bulletin des Travaux de la Societé de Pharmacie de Paris, but it was found that it could not be properly supported under so exclusive a designation, wherefore the name and plan of the work were changed and placed on a more liberal and extended footing, though it still remains under the guidance of the Society.

Your committee beg leave to propose the following resolutions:

1. That the title of the Journal of the Philadelphia College of Pharmacy, be changed to that of the American Journal of Pharmacy, published by authority of the Philadelphia College of Pharmacy &c.

- 2. That the number of the Publishing Committee be increased to ten.
- 3. That the Publishing Committee be authorised to appoint correspondents in different parts of the United States, whose names shall be published in conjunction with those of the Publishing Committee, on the cover of each number.

The report of the committee and the accompanying resolutions were adopted.

The committee on Patent Medicines made a report, highly disapproving of the printed directions which now accompany those patent medicines which have been recognized by the College, and for which scientific formulæ have been published, and recommending the adoption of more proper and suitable directions.

On which it was resolved, that the subject be referred to a committee who are requested to report such directions to accompany the patent medicines recognized by the College, as shall in their judgment be more proper and suitable than those now in use.

E. Durand presented a series of translations by A. Duhamel, from the *Journal de Chimie Medicale*, which were referred to the Publishing Committee.

The society then went into the annual election for officers, when the tellers reported the following as duly chosen:

President-D. B. Smith.

Vice Presidents-Henry Troth, S. Jackson, M. D.

Recording Secretary-Charles Ellis.

Corresponding Secretary-Elias Durand.

Treasurer-Edward B. Garrigues.

Trustees—Warder Morris, Edward Needles, Edward Roberts, John C. Allen, Charles Dingee, Stephen Proctor, Thomas H. Powers and Richard M. Reeve.

Publishing Committee—D. B. Smith, G. B. Wood, M. D., F. Bache, M. D., Charles Ellis, Joseph Scattergood, John C. Allen, William Hodgson, jr., Elias Durand, Dillwyn Parrish and R. E. Griffith, M. D.

Miscellany.

Sulphate of Quinine.-M. M. Pelletier and Desprez have patented the following improvements in manufacturing sulphate of quinine. Their principal object is the production of sulphate of quinine by means of distilled or expressed oils, whether derived from vegetable, animal, or mineral substances, and without the aid of alcohol. Where a distilled oil is intended to be used, the bark having been treated by acids, and having precipitated the quinine and the other soluble matter by means of lime, in the usual method, the calcareous precipitate is to be dried and reduced to a fine powder; it is then to be treated several times, say seven or eight, with the oil intended to be used; and from experience, oil of turpentine has been found to answer best. The oil is then to be separated by decantation or filtration. When expressed oil is used, care must be taken that the lime be all extracted, otherwise an insoluble soap of lime would be formed. The precipitate must then be dissolved in an acid, and the rough quinine precipitated by ammonia; when in this state it must be treated with oil several times, which will dissolve the quinine, and separate it from all foreign bodies. After thus obtaining the quinine in solution, the oil is to be treated with water acidulated with any acid capable of forming a soluble salt with the quinine, (hydrochloric is the best,) the acidulated water separates the quinine from the oil, the separation being easily effected by decantation, as the two liquids having different specific gravities, will not unite. The quinine thus dissolved is to be precipitated by an alkali, and afterwards formed into a sulphate by the addition of sulphuric acid, having been previously whitened by animal charcoal. Repert. of Arts.

Cyanide of Gold. M. O. Figuier, of Montpelier, has lately made some interesting remarks on the cyanide of gold. To obtain it, he decomposes the chloride of gold with the cyanide of potassium, as has been recommended by others; but he states that many precautions are necessary to procure it in a pure state. The chloride must be as neutral as possible, which can only be done by recrystallizing this salt several times. The cyanide must not be alkaline, or contain any formiate or carbonate of potash. This salt is to be added to the solution of the chloride of gold very cautiously, as long as there is any precipitate, taking care that there

is not the slightest excess of the cyanide, as this would cause a solution of part of the product, and the formation of soluble double cyanides. The cyanide thus made, is to be well washed with pure water, and dried in a dark place. M. Pourche, who has used it successfully in syphilis and scrofula, recommends its administration in the form of frictions on the ongue, mixed with powdered orris root, well washed in alcohol and dried:

Cyanide of gold, gr. i.
Powdered orris root, gr. iij.
In pills, he prescribes:

Cyanide of gold, . . gr. i. Ext. Mezereon gr. iij. Powdered Mallows, q.s.

for pills of five grains.

In children, the dose at first should never exceed one-fifteenth of a grain.

Journ. de Pharm.

Combinations and properties of Zinc. Besides the different metals that have been long since known to exist in the zinc of commerce, M. Schindler has recognized in it the presence of uranium, and of a combination of carbon with zinc. Both are found in the blackish residue obtained by the solution of zinc in sulphuric acid; uranium, however, in small quantity, one grain from two pounds of zinc. It is to the presence of the carburet that the odour always possessed by hydrogen obtained from commercial zinc, is to be attributed. M. Schindler attributes the yellow colour, which the oxide of zinc obtained by calcination almost always displays, not to iron, as is generally supposed, but to the presence of a new metal, which he has not been able to separate. Although oxide of zinc is readily soluble in a solution of potash, it is with difficulty, and only in small quantity, dissolved by aqua ammonia; the presence of an arseniate or a phosphate even in very small quantity, enables water of ammonia to dissolve it in considerable proportion. Ammonia cannot be said to precipitate oxide of zinc, as the oxide retains a quantity of the alkali, which cannot be separated without great difficulty, and which attracts carbonic acid.

He has obtained a hydrate of the oxide of zinc in small rhombohedral crystals, by plunging into water of ammonia, iron and zinc, connected together. A very abundant disengagement of hydrogen takes place, and the crystals are deposited on the sides of the vessel and on the zinc; they are very brilliant, and on the application of heat are converted into an anhydrous oxide; they are composed of one atom of oxide and one of water. The hydrated sulphuret of zinc can be obtained in small crystals, composed of one atom of sulphuret, + one atom of water; heat

separates but one-half of the water, the remainder cannot be disengaged until the sulphuret is decomposed. The common sulphate of zinc contains, according to M. Schindler, seven atoms of water, not five, as generally supposed.

Besides these different bodies, he has described three basic sulphates of zinc. The first, the Sulphas bizincicus, is soluble, uncrystallizable and very easily decomposed. The second, Sulphas quadri-zincicus, cannot be obtained in an anhydrous form; it is crystallizable, and scarcely soluble in water. Treated at a temperature of 80° or 100° R., it loses a portion of its water, and its composition corresponds then to a salt hitherto considered to contain three atoms of oxide. The third of these salts contains eight times as much base as the neutral salt, and is insoluble in water. Heated strongly, it is decomposed into pure oxide of zinc and neutral sulphate, in consequence of the loss of the water necessary to its composition.

Arcana of Science and Archiv. der Apot.

Purification of Palm Oil. Take two parts of quick lime, and three parts of muriate of ammonia, the lime having been previously slacked with half its weight of water, and allowed to cool, and reduced to a fine powder, and then intimately blended with the powdered lime. The mixture is to be put into a still or cast iron pan, having a close cover, and a tube leading from the head of the pan or still, to near the bottom of the soap copper, which should contain equal quantities of water and palm oil. On fire being applied to the still, the ammoniacal gas will pass over into the soap copper; and as the water and oil combine, continue adding boiling water to the extent of treble the weight of the palm oil in all. By this process, the colour of the palm oil will be almost instantaneously changed to a pale yellow. The boiling palm oil and water should of course be rapidly stirred while the gas is passing through. The ammonia being an alkali, adds to the strength and detergency of the soap.

Journ. Frank. Inst. and Lond. Mech. Mag.

New principle in Cloves. M. Bonastre has discovered a new crystal-line substance in cloves, and which he calls Eugenine. This substance is formed in a certain time in water which has been distilled over cloves, and has become strongly impregnated with their soluble principles. It crystallizes in thin, white, pearly, transparent tables; by exposure to the air it becomes somewhat yellow. Alcohol and sulphuric ether dissolve this substance in all proportions. It has but little taste, and its smell is much weaker than that of cloves. It becomes of a vivid blood red colour on the addition of cold nitric acid, in this particular resembling the oil of cloves. From the analysis of M. Dumas, it appears to differ from oil of cloves only in the loss of an atom of water. It differs from caryophylline in its crystalline form, its solubility, &c.

Journ. de Pharm,

New Sarsaparilla. M. Virey describes a new kind of sarsaparilla, which had been imported into France from the island of Bourbon. It consists of long, slender, root-like stems, of an ash gray colour, with the epidermis very slightly adherent. The wood or medullary portion is of the thickness of a quill; some stems, however, are as thick as the finger, the epidermis of these is brown externally, and reddish or orange coloured within. This substance has very little taste. M. Virey is of opinion that although it has many points of resemblance to the sarmentose smilax of the Philippine islands, that it is not identical with it, but seems inclined to believe that it may prove to be the product of the S. borbonica, which is used in many parts of the east as a remedy in syphilitic affections.

Journ. de Pharm.

Syrup of Pomegranate Root. M. Dublanc, of Troyes, found that cold water took up a much larger proportion of the extractive principles of the bark of the pomegranate root than when this fluid was used in a boiling state, in which latter case the product was thick, turbid and partly insoluble; by means of a rapid evaporation of a cold infusion of pomegranate root, he obtained from two ounces of this substance, (the usual dose for an adult,) a dry extract, in translucent scales, this was somewhat bitter, and a little astringent, and generally weighed about 4 drachms, or 1 of the weight of bark used. Wishing afterwards to concentrate the greatest quantity of extract in the least possible proportion of water, without heat, and by immediate concentration, he submitted five or six different portions of the root, each weighing as above, to the action of the same water, using the method of displacement proposed by M. M. Boullay. The liquid thus obtained, marked 15° of the areometer for syrups, it was perfectly transparent, and remained so for a long time; this furnished him in a few moments, by a rapid evaporation, fifty per cent. of dry extract. He therefore thought that this infusion at 15°, presented the active portions of the remedy in a concentrated and unaltered state. He prepared with it the following syrup:

Infusion of pomegranate root at 15°

White sugar, aa

The sugar is to be melted in the liquid by means of a water bath, strained and kept for use. This syrup contains a fourth of its weight of active principles, and four ounces, for example, correspond to two ounces of the root.

Journ, de Pharm.

Amalgam of Platinum. Muschin Pushkin describes an easy method of forming this amalgam. It may be more conveniently and quickly formed, says Professor Mather, by heating the chloriodide of platinum with mercury in a tube. The iodine and chlorine combine with mercury

and sublime, while the platinum, in its nascent state, combines with mercury and remains at the bottom. The heat should be high enough to make the mercury boil. The amalgam, after having been pressed in soft leather, to remove the excess of mercury, is a soft solid, having the same kind of feel, and emitting the same sound when pressed between the fingers, as the amalgams of gold and silver. It is several times heavier than the platinum of which it was formed.

Amer. Journ. Sci. and Arts.

Creosote. M. Calderini of Milan, has given the following process for preparing creosote. The essential oil obtained by the destructive distillation of wood, is to be put into an iron vessel, and exposed to a gentle heat. The vessel is then to be taken from the fire, and slaked and sifted lime to be added gradually, and the mixture constantly stirred until the effervescence ceases, and the whole becomes a hard mass, which is to be allowed to cool, and then powdered. A cast iron retort is to be twothirds filled with this powder and placed in a reverberatory furnace. A receiver is to be fitted to the retort at the moment when the white fumes which first come over, become yellowish. The distilled liquor is to be placed in a filter of paper moistened with water to permit only the aqueous part to pass, and the oil left is to be washed with pure water, which is to be allowed to filter. The oil, thus washed, is to be placed in an iron vessel, and aqua potassæ of specific gravity 1.125, is to be added in the proportion of three parts to two of the oil. The mixture is then to be boiled for a moment with a gentle heat, after which it is to be taken from the fire, allowed to cool, filtered, and mixed with dilute sulphuric acid, till it becomes slightly acid. The mixture is then to be left at rest, and an oily matter will be found floating on the top, which is impure creosote. This is to be collected, washed on a filter, put into a glass retort, placed in a sand bath, and distilled. The first portion is to be set aside, and what comes over afterwards, of a pale yellow colour, is crecsote. The distillation is to be stopped when the drops become of a deeper colour. If the distilled creosote be not sufficiently pure, it is to be dissolved in acqua potassæ, and treated as before, always rejecting the first and last parts that come over, and this process is to be repeated until it becomes perfectly pure. When the creosote is obtained pure it is to be kept in well stopped bottles. It is known to be pure when it is colourless, transparent, and of a specific gravity of 1.037, and possessed of great refrangibility. Edinburg Medical and Surgical Journal,

Action of Potash on Organic Substances. From the experiments of Gay Lussac, it appears that a great variety of vegetable and animal substances treated with caustic potash or soda, at a temperature much below redness, are transformed into oxalic acid, and at a higher heat, into carbonic acid. This is the case with sawdust, cotton, starch, gum, tartaric, citric and malic acids, silk &c. Some vegetable substances give out hydrogen and carbonic acid at the same time; and animal bodies, in addition to these two, afford ammonia and cyanogen. It is remarkable, that tartaric acid disengages scarcely any hydrogen, and does not become blackened. Tartar may be transformed into oxalate of potash by a very simple process; this consists in dissolving the tartar in water, with a suitable quantity of potash or soda, and forcing the solution by means of a pump, into a thick tube of iron or brass, heated to 400° F. The pressure would be but about twenty-five atmospheres, as no gas is disengaged.

Ann. de Chim.

Cause of Crystallization. M. Gaudin, in his investigations on the properties of atoms, has been led to some interesting conclusions. According to him, those bodies crystallizing in a cube have for their primitive molecule a point or right line; either an atom, as in metals; two dissimilar atoms, as in sulphuret of lead; three atoms, one of one kind, and two of another, as chloride of sodium; again, those molecules having for their form a double simple pyramid, or a prism of a number of sides, which are a multiple of forms, may be assimilated to points, when under different circumstances they form in groups around an accidental nucleus, and in this way sometimes crystallize in cubes. Those bodies whose cleavage gives a right prism, with any base whatever, have for their primitive molecule, either the polygon of the base, or a double simple pyramid, or a prism of a number of sides, equal or double. When the primitive prism is not cleavable perpendicularly at the axis, it is because the molecules are polarized, that is, retained together either by an electric force, or by the force of affinity. The tetrahædron, octahædron and rhomboihædron, have respectively for their primitive molecule, the first a square, or a rhomb, the second a double tetrahædral or octahædral pyramid, either simple or with an intervening prism, and the third a double hexahædral pyramid of the same nature. Finally, the absence of cleavage in these bodies is owing to want of continuity of the molecules. But in the tetrahædron, the want of continuity depends solely on the state of polarization, whilst in the octahædron and rhombohædron, it results from the aggregation of the molecules. Journ, de Chim. Med.

Citrate of Quinine. Dr. Galvani gives the following process as affording a pure article. One part of sulphate of quinine is to be dissolved in forty parts of pure boiling water, and acidulated citrate of soda, added gradually to the solution; at first litmus paper is not reddened by the liquor, but on the addition of more of the citrate, that paper is changed to

effected, and that citrate of quinine is formed. The liquor is to be filtered while near boiling, and on cooling, the salt crystallizes; at the end of six hours, the crystals are to be separated from the mother liquor, drained and washed with a little distilled water, and pressed. They may be dried between folds of bibulous paper, and pressed. On evaporating the mother water, more crystals are formed, and the whole of the salt thus obtained.

Annali Univer. di Med.

White Agaric. M. Andral has found that the white agaric, (Boletus larycis,) is capable of checking the night sweats in consumptive patients. He uses it at first in doses of 8 grains, made into pills; then increasing to 48 or 60 grains a day, without any sensible derangement of the digestive functions being produced.

Journ, de Pharm.

Mastich for carious teeth. Various articles have been used to fill the cavities of carious teeth, as resinous, balsamic or saline compositions, the fusible alloy of Darcet, and leaves of various metals, as gold, silver, lead &c. But all these are sometimes insufficient or impracticable, where the tooth is much decayed, or the nerve is exposed. In the first case, the filling employed is liable to fall out; in the second, proper force cannot be applied, on account of the pain. In such circumstances the following compound has been found useful:

Mastich, 4 parts, Sulphuric ether, 1 part.

The solution of the resin is readily effected, without the assistance of heat, in a well closed vessel; the result is a liquid of a lemon yellow colour, of an oily consistence, which on exposure to the air becomes of the consistence of pitch, and at last quite friable, but softening by a moderate degree of heat. To employ it, a small dossil of cotton, of a size to fill the cavity of the tooth, is to be saturated with the liquid, and introduced into the decayed tooth. By the heat of the mouth, the ether is soon dissipated, and the remaining resin adheres firmly to the tooth; this resin remains sufficiently soft not to be detached in scales or fragments, and completely protects the interior of the tooth from the action of the air, and the introduction of fragments of food.

Journ. de Pharm.

Prussian blue. Mr. G. Lowe, of London, has taken out a patent for making Prussian blue from the refuse of coal gas works. To produce a pure blue, he directs one ounce of sulphate of iron in solution, to be well mixed with one gallon of the ammoniacal liquor of a specific gravity of 1.031. To the mixture is then to be added fourteen ounces of sulphuric

acid of a specific gravity of 1.850. A precipitate of Prussian blue will be formed of good quality.

Where an impure blue is wanted, an ounce and a half of a solution of sulphate of iron is to be mixed with a gallon of the lime water with which the gas has been purified. Fourteen ounces of sulphuric acid then to be added, a precipitate will form consisting of Prussian blue, combined with sulphate of lime.

Repert. of Arts.

Colouring principle of Cornelian. From the observations of Dufay, and the experiments of M. de Claubray, it appears that the colouring matter of the cornelian is not an oxide of iron, but of an organic nature. The latter chemist found that when powdered cornelians were mixed with black oxide of copper, in a porcelain retort, and heated to redness, carbonic oxide and carbonic acid were disengaged, and hydro-acetic acid and a pyrogenous oil were formed.

Annal. de Chim.

Crystallized Tin from Solution. Professor Mather states that having occasion to form a solution of muriate of tin, some muriatic acid was poured upon an excess of spongy grain tin. The solution was formed on the sand bath, and it was so concentrated as to be oily in its consistence. The solution being more concentrated than was desired, it was diluted and allowed to stand on the sand bath, exposed to the air. In a short time the undissolved tin was observed to be coated with crystals of metallic tin. Some of the crystals were small and granular, having many facets; some were long acicular prisms, and others were in foliated plates and plumose, like the precipitated lead of the arbor saturni. One of the acicular crystals, of the diameter of a horsehair, was mounted on the reflective goniometer. It had four brilliant planes, giving distinct reflected images, and each face inclined to the adjacent ones at angles of 90°. The experiment of crystallizing tin was repeated many times with the same result, using not only the spongy, but also the columnar grain tin. In the latter, the acid dissolved a crystalline structure, and probably it is owing to this crystalline structure that tin emits a peculiar crackling noise when bent.

If the solution containing the crystals of tin be set aside in a cool place, for twenty-four hours, they redissolve. The concentrated solution, when set aside until cool, and then diluted with water, will also vegetate, but the crystals form more slowly than when the hot solution is diluted. The crystallization can be shown before a class in the lecture room, and it is more beautiful than that of the arbor Diana.

Amer. Journ. Sci. and Arts.